GTE-ERS
TECHNICAL LIBRARY
19527

ESC 4237 97 01

HITACHI

MODEL V-209
OSCILLOSCOPE

SERVICE MANUAL

Hitachi Denshi, Ltd.

CONTENTS

1. Specifications 1
2. Accessories 6
3. Preventive maintenance 7
4. Calibration 9
   - 4.1 Calibration interval 9
   - 4.2 Test equipment required 9
   - 4.3 Preliminary control settings 9
   - 4.4 Preliminary control settings 11
   - 4.5 Initial starting procedure 11
     - · POWER SUPPLY SYSTEM 12
     - · DISPLAY 12
     - · HORIZONTAL SYSTEM 14
     - · VERTICAL SYSTEM 15
     - · CALIBRATOR 19
     - · BATTERY CHARGER 20
5. Semiconductor lead configurations 21
6. Electrical parts arrangement 23
7. Electrical parts list 27
8. Schematic diagrams 39
9. Mechanical parts list and exploded view 56

NOTICE

This Service Manual describes the most typical product of this model. If there are any specific differences between this Manual and the servicing unit, please contact Hitachi Denshi sales office in your area.

Digitized by the Internet Archive
in 2025

https://archive.org/details/manualsplus_07174

MODEL V-209
OSCILLOSCOPE
Service Manual

1. SPECIFICATIONS

CRT

Type

Hitachi 95MB31 rectangular type tube with approx. 1.5 kV acceleration potential and metal backed phosphor

Phosphor

P31 standard

Graticule

8 × 10 div (div = 6.35 mm) internal graticule

Focusing

Possible (with automatic focus correction circuit)

Trace rotation	Present
Brightness adjustment	Possible

Z-AXIS INPUT (INTENSITY MODULATION)

DC-coupled, positive-going signal decreases intensity: 5 Vp-p signal causes noticeable modulation at normal intensity: DC to 1 MHz.

Input impedance	Approx. 50 kΩ
Maximum input voltage	50 V (DC + peak AC)
Coupling	DC

VERTICAL DEFLECTION SYSTEMS (2 Identical Channels)

Bandwidth and rise time

DC to at least 20 MHz and rise time 17 ns or less. DC to at least 5 MHz and rise time 35 ns or less at magnifier extends. The AC coupled lower -3 dB point is 10 Hz or less.

Deflection factor

5 mV/div to 5 V/div in 10 calibrated steps, in a 1-2-5 sequence

The uncalibrated continuous control extends deflection factor to at least 12.5 V per division in the 5 volts/div position. The ×5 magnifier increases sensitivity of each deflection factor setting to 1 m/div.

Accuracy

±3 % (+10 to +35 °C)

Additional error for magnifier ±2 %

Display modes

CH1, CH2 (normal or invert), Alternate, Chopped (Approx. 250 kHz), Added

Input impedance

1MΩ±2% in parallel with 30±3pF.

Maximum input voltage

250 V (DC + peak AC)

Input coupling

AC, GND, DC

HORIZONTAL DEFLECTION SYSTEM

Time base

0.5 μs/div to 0.2s/div in 18 calibrated steps, in a 1-2-5 sequence

The uncalibrated continuous control extends deflection factor to at least 0.5 seconds per division in the 0.2 sec/div position. The ×10 magnifier extends maximum sweep rate to 50 ns/div.

Accuracy

±3 % (+10 to +35 °C)

Additional error for magnifier ±2 %

TRIGGERING SYSTEM

A trigger modes

Automatic, Normal, Single sweep, TV (TV-H or TV-V)

A trigger hold-off

Adjustable control permits a stable presentation of repetitive complex waveform.

A trigger source

Internal (CH1, CH2), Line, External

Trigger slope

+ or -

TV sync polarity

TV (-)

Triggering level variable range

Internal; ±4 div or more

External; approx. ±1 V

Triggering sensitivity and frequency

Frequency	Internal	External
20 Hz - 5 MHz	0.5 div	150 mV
5 - 20 MHz	1.5 div	500 mV

TV-V sensitivity: SYNC section less than 0.7 div or 200 mV

AUTO: Approx. 30 Hz (when time base is 0.1 μs/div to 2 ms/div)

Trigger coupling

AC : 30 Hz to full bandwidth

External trigger input impedance

1 MΩ ±20 % in parallel with 32 pF±6 pF

Maximum input voltage

250 V (DC + AC to 1 kHz or less)

X-Y OPERATION (CH1; Horiz, CH2; Vert)

Deflection factor

Same as vertical deflection

Accuracy

Y: ±3 % (+10 to +35 °C)

X: ±5 % (+10 to +35 °C)

Additional error for magnifier +2 %

X-bandwidth

DC to at least 200 KHz

Phase error

3 ° or less from DC to 100 kHz

CALIBRATOR

An approx. 1 kHz frequency 0.5 V (±1 %) square wave.

POWER SUPPLY

VOLTAGE	FUSE
100 V (90 - 130 V)	1 A
200 V (180 - 260 V)	0.5 A

Power supply frequency: 50, 60, 400 Hz

Power consumption: Approx. 18 W

ENVIRONMENT

Limit of operation temperature	0 - 50 °C
Limit of operation humidity	35 - 85 %
Rated range of use temperature	10 - 35 °C

Rated range of use humidity	45 - 85 %
Storage and transport temperature	-20 - 70 °C
	(except the Battery Pack AD-209)

DIMENSIONS AND WEIGHT

Approx. 215(W) ×110(H) × 330(D) mm
(8.6(W) × 4.4(H) × 13(D) in)
Approx. 4.5 kg (9.9 lbs)

2. ACCESSORIES

This instrument is shipped along with following accessories.

- 2 Probes (AT-10AF 1.5)
- 1 Fuse (1A for 100 V set or 0.5 A for 200 V set)
- 1 Fuse (2A for DC line)
- 1 AC power cord
- 1 DC power cord
- 1 Operation Manual

3. PREVENTIVE MAINTENANCE

Preventive maintenance, when performed on a regular basis, can prevent instrument breakdown and may improve the reliability of the oscilloscope. The severity of environment to which this instrument is subjected will determine the frequency of maintenance. A convenient time to perform preventive maintenance is just prior to the recalibration of the instrument.

Disassembly

Remove the 4 screws in the top cover of the instrument. Gently remove the top cover from the instrument. Most of the internal parts of the instrument are now accessible.

If it is necessary to have access to the front of the circuit boards, remove the knobs from the external control shafts on the board. Remove the two screws securing the side panel to the input circuit board, and remove the instrument side panel. (See section 9. Exploded view)

Cleaning

The instrument should be cleaned as often as the operating conditions require, since the accumulation of dirt in the instrument may cause the component breakdown.

The covers can provide protection against dust in the interior of the instrument. Loose dust accumulated on these covers can be removed with a soft cloth or small brush.

Dirt that remains can be removed with a soft cloth applying in a mild detergent and water solution. Abrasive cleaners should not be used. Cleaning the interior should be only occasionally necessary. The best way to clean the interior is to blow off the dust with a dry, low-velocity stream of air. A soft-bristle brush or a cotton-tipped applicator is useful for cleaning narrow spaces or for cleaning more delicate components.

Visual inspection

The instrument should be inspected occasionally for such defects as broken connections, improperly seated transistors, damaged circuit boards, and heat-damaged parts. The corrective procedure for most visible defects is apparent; however, particular care must be taken if heat-damaged components are found. Overheating usually indicates other trouble in the instrument; therefore, correcting the cause of the overheating is important to prevent the recurrance of the damage.

4. CALIBRATION

Hitachi Denshi, Ltd. provides complete instrument repair and recalibration at our office, and authorized dealer. Contact your local Hitachi Denshi sales office or representative.

4.1 Calibration interval

To maintain instrument accuracy, perform the calibration of the V-209 at least every 1000 hours of operations or every six month if used infrequently.

4.2 Test equipment required

The following test equipment and accessories, or its equivalent, are required for the complete calibration of the V-209. Specifications given for the test equipment are the minimum necessary for accurate calibration. Therefore, the specifications of any test equipment used must meet or exceed the listed specifications. All the test equipment is assumed to be correctly calibrated and operated within the listed specification. Operating instructions for the test equipment are not given in this procedure. Refer to the instruction manual for the test equipment if more information is needed.

4.3 Preliminary procedure

This instrument should be calibrated at an ambient temperature of +20 °C ($\pm$5 °C) for best overall accuracy.

1. Connect the instrument to AC line voltage, 50/60/400 Hz line source.
2. Set the instrument controls as given in the preliminary control settings. Allow at least fifteen minutes of warmup before proceeding.
3. See the adjustment locations in the pullout pages.

Table 4-2

TEST EQUIPMENT REQUIRED

Description	Minimum specification	Usage	Example of applicable test equipment
1. Constant amplitude signal generator	50kHz reference frequency; maximum frequency 70MHz; variable amplitude.	Check horizontal, vertical and trigger bandwidth.	
2. Standard amplitude Calibrator	Amplitude accuracy: 0.25%, variable amplitude; 5mV to 40V; frequency: 1 kHz square wave.	Check horizontal and vertical gain.	
3. Square-wave Generator	Variable frequency: 10Hz to 1MHz; output amplitude; 10mV to 100V.	Check probe and vertical compensation.	
4. Digital voltmeter	0.1% accuracy.	Check power supply	
5. Time mark generator	0.1% accuracy.	Check horizontal timing.	
6. Cable	Impedance, 50 ohms; type, RG-58/U; length, 42 inches, connectors, BNC	External trigger operation check. Horizontal gain check and adjustment.	Hitachi part No.4202
7. Termination	Impedance, 50 ohms; connectors, BNC	Vertical amplifier compensation checks and adjustment.	
8. Attenuator	Ratio, 1/10; connectors, BNC; impedance, 50 ohms.	Vertical amplifier bandwidth check.	
9. T-connector	Connectors, BNC.	External trigger operation checks.	Hitachi part No.1301
10. Power supply	Voltage range: 10-16V stability 0.5% or less	Battery charger operation check and adjustment	
11. Resistor	56-68 ohms 5W	Battery charger operation check and adjustment	

4.4 Preliminary control settings

Set the instrument controls as follows, when starting the calibration procedures.

Controle	Settings	Controls	Settings
FOCUS	Midrange	FINE	Midrange
TRACE ROTATION	As desired		
- VERT -			
V. POSITION	Midrange, pushed in	SWP VAR	Fully clockwise
V. VARIABLE	CAL, fully clockwise		
INPUT COUPLING	GND (AC-GND-DC)	- TRIG -	
VOLTS/DIV	5 mV/DIV		
V. MODE	CH1	LEVEL	Midrange, Normal
- HORZ -		SLOPE	+ Normal
CH2 INV	Normal (Button Out)		
H. POSITION	Midrange	MODE	Auto
PULL X10 MAG	Midrange, Normal		
TIME/DIV	1 ms	SOURCE	CH1

4.5 Initial starting procedure

1. Rotate the INTENsity control to the midrange and set the POWER switch to ON.
2. Wait a few seconds for the cathode ray tube (CRT) to warm up. A trace should appear on the display of the CRT.
3. If trace disappears, increase (clockwise) the INTEN sity control setting until the trace is easily observed, or roughly check/adjust the DC balance to get a trace as same as (12).
4. Adjust the FOCUS control for the best focused display.
5. Readjust the POSITION controls if necessary, to center the trace.

POWER SUPPLY SYSTEM

NOTE

Before you start operation, see the adjustment locations in the pullout pages.

Control settings

Preset the controls as given in the preliminary control setting.

(1) Check low-voltage supply, if necessary

a. Connect the digital voltmeter (DVM) between the +8 V line (P1101-3) and ground

: +8 to +8.3 V

b. Connect the DVM between the -8 V line P1101-5 and ground

: -7.85 to -8.15 V

c. Connect the DVM between the +5 V line P1101-4 and ground

: +4.8 to +5.4 V

d. Connect the DVM from the +80 V line and ground

: 79.9 to 80.1 V (C1174+)

(2) Adjust low-voltage supply.

Adjust the adjustment RV1102 for +80 V ±0.1 (P1101-2).

(3) Check high voltage supply.

a. Connect the DVM to the H.V. test point (P904-3) with a high voltage probe.

b. Check for a reading of -1.35 - -1.43 kV.

DISPLAY

Control setting

Preset the controls as given in the preliminary control setting.

(4) Check/adjust CRT bias.

Set DISPLAY to the position, and set the TIME/DIV switch to the 20 μs.

a. Connect the digital voltmeter (DVM) to the R828.

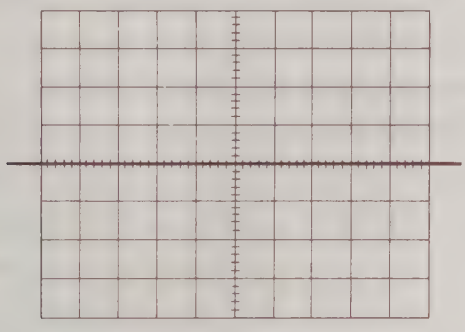
b. Adjust the grid bias adjustment RV1021 so that the DVM indicates 0.25 V.

⑤ Check/adjust trace rotation.

a. Position the trace to the center graticule line.

b. Check that the trace is in parallel with the center horizontal line.

c. Adjust TRACE ROTATION (screwdriver adjustment on front panel) for a trace that is in parallel with the horizontal graticule lines.



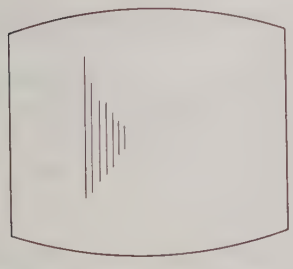
⑥ Check/adjust GEOMetry

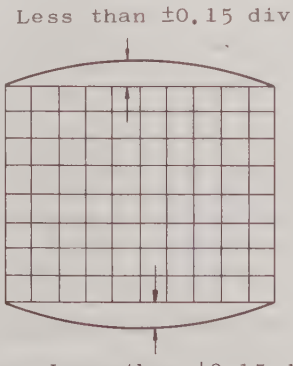
a. Set the TIME/DIV to the 0.1 ms, and the input coupling switch to DC.

b. Connect the constant amplitude signal generator to the input.

c. Set the VOLTS/DIV switch setting for a full-screen (8 division) deflection.

d. Check that horizontal bowing is less than ±0.15 division.

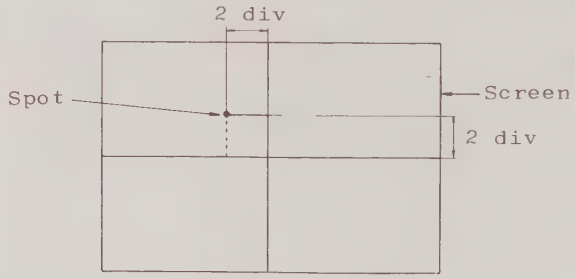




⑦ Check/adjust ASTIGmatism and FOCUS.

a. Set the vertical mode switch to the CH2 X-Y position, and the display switch to the X-Y position, and the input coupling switch to GND.

b. Set the INTENsity control for a small spot, as the following figure, using the position controls.



c. Check that the spot is round.

d. Adjust the FOCUS adjustment and ASTIG adjustment RV1042 for a round spot.

HORIZONTAL SYSTEM

Control settings

Preset the controls as given in the preliminary control settings.

⑧ Check/adjust horizontal gain.

a. Check that the time marks align with the graticule lines over the center eight divisions, within 0 %.

b. Adjust the H GAIN adjustment RV830 so that the time marks align with the center eight graticule lines.

⑨ Check/adjust Horizontal ×10 MAG Gain.

a. Set the TIME/DIV switch to the 1 ms.

b. Set ×10 MAG (Pull out the inner knob of the POSITION control).

c. Check that the one-cycle time marks align with the ten-divisions graticule lines, within 0 %.

d. Adjust the MAG GAIN adjustment RV831 so that one-cycle time marks align with the ten-division graticule lines.

e. Push in the inner of the POSITION control after adjustment and check.

⑩ Check/adjust MAG CENT.

a. Set the TIME/DIV switch to the 0.1 ms.

b. So that the inner shaft of H. POSITION is pulled out (×10 MAG), the left end of the trace is brought to the center point and then the inner shaft of H. POSITION is depressed.

c. Observe the movement of the left end of the trace.

d. Adjust the MAG CENT adjustment RV829 for the movement of the left end of the trace within ±0.2 div.

⑪ Check/adjust high speed sweep accuracy.

a. Set the input coupling switch to DC.

b. Set the time mark generator for 2 μs time marks.

c. Set the TIME/DIV switch to 2 μs.

d. Check that the time marks align with the graticule lines over the center eight divisions.

e. Adjust CV564 so that the time marks align with center eight graticule lines.

VERTICAL SYSTEM

⑫ Check/adjust DC balance (Step attenuator balance).

a. Set the VOLTS/DIV switch to the 5 mV position.

b. Position the trace to the horizontal center line.

c. Change the VOLTS/DIV switch to the 10 mV position.

d. Check that the trace is within ±0.05 division of the center horizontal line.

e. Adjust the CH1 (CH2) DC BAL adjustment, RV27 (CH1) or RV127 (CH2), for a trace at the horizontal center line.

f. Repeat the part (a) through (e) until less than ±0.05 division shift is noted when changing the VOLTS/DIV setting.

⑬ Check/adjust vertical position center.

a. Confirm the vertical POSITION control at the midrange.

b. Check the trace is within 1 division.

c. Adjust the position center adjustment RV97 (CH1), RV197 (CH2) for a trace at the horizontal center line.

⑭ Check/adjust ×1 AC GAIN.

a. Set the TIME/DIV switch to the 1 ms position.

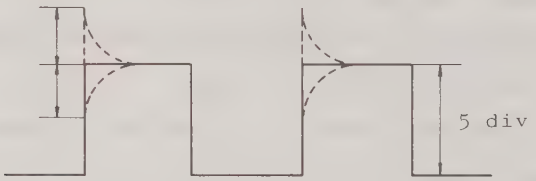
b. Set the VOLTS/DIV switch to the 10 mV position.

c. Set the input coupling switch to DC.

d. Connect the square-wave generator (using 1 kHz output range).

e. Adjust the output amplitude of that generator for 5 division deflection of screen.

f. Check the high-voltage level of pulse is flat.



g. Adjust the ×1 AC GAIN RV33 (CH1), RV133 (CH2) adjustment for a flat level.

⑮ Check/adjust vertical gain.

a. Set the VOLTS/DIV switch to the 10 mV position and the input coupling switch to DC.

b. Connect the standard amplitude calibrator to the input connector.

c. Set the standard amplitude calibrator for a 50 mVp-p (5 divisions for display) signal.

d. Check for a display of five divisions.

e. Adjust the GAIN adjustment RV84 (CH1), RV184 (CH2) for a display of 5 divisions within 2 %.

f. Check all the VOLTS/DIV switch settings.

⑯ Check/adjust input capacity (ATT: ÷1).

a. Set the VOLTS/DIV switch to the 10 mV position.

b. Set the input coupling switches to DC.

c. Connect the L-C meter to the input terminals.

d. Check the input capacity for approx. 30 pF.

⑰ Check/adjust vertical step response.

a. Set the VOLTS/DIV switch to the 5 mV position.

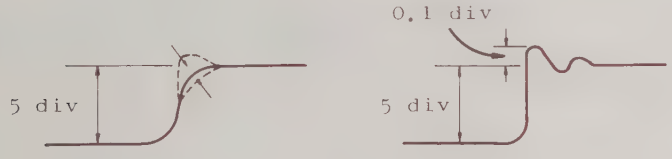
b. Set the TIME/DIV switch to the 0.5 μs position.

c. Connect the fast-rise, positive output (50 mV, 1 MHz) of the square-wave generator to the input. Use a 50Ω termination and cable.

d. Adjust the square-wave generator output for a 5-divisions display.

e. CH1 - Adjust CV303 and CV313 so that a square-wave is flat. Then, adjust CV303 for over-shoot of +0.1 div.

CH2 - Adjust CV182 for over-shoot of +0.1 div.



⑱ Check/adjust attenuation compensation.
(ATT : ÷10, ÷100)

a. Set the input coupling switch to DC.

b. Connect the square-wave generator to the CH1 (CH2) input terminal check for a square wave that is flat (flat top) under the following settings.

ATT	VOLTS/DIV	Square-wave generator output
÷10	0.1 V	0.5 V
÷100	1 V	5 V

c. Adjust the trimmer condensers (refer to the circuit board illustration with adjustment location - page (23) for a square wave that is flat (flat top) under the following settings.

ATT	VOLTS/DIV	Square-wave generator output	Adjust CH1 (CH2)
÷10	0.1 V	0.5 V	CV7 (CV107)
÷100	1 V	5 V	CV12 (CV112)

(19) Check/adjust input capacity (ATT: ÷10, ÷100).

a. Connect the L-C meter to the input connector.

b. Check the input capacity for a approximately 32 pF.

c. Adjust the trimmer condensers for a 32 pF input capacity under the following settings.

ATT	VOLTS/DIV	Adjust CH1 (CH2)
÷1	5 mV	—
÷10	0.1 V	CV6 (CV106)
÷100	1 V	CV11 (CV111)

(20) X-Y operation

21-1 Check/adjust X gain.

a. Set the vertical MODE switch to CH2 X-Y, the TIME/DIV switch to X-Y, the input coupling switch of CH1 to AC, the input coupling switch of CH2 to GND.

b. Set the VOLTS/DIV switch to the 10 mV position.

c. Connect the standard amplitude calibrator to the CH1 input connector.

d. Set the standard amplitude calibrator for a 50 mV.

e. Check for a display of five divisions.

f. adjust the X GAIN adjustment RV591 for a display of five divisions within 4 %.

20-2 Check/adjust X position center.

a. Set the TIME/DIV switch to the X-Y position, the vertical MODE switch to the CH2/ X-Y position and the horizontal POSITION control to the midposition, the input coupling switch of CH1 to GND.

b. Check to see that the round spot is near the center graticule and is within ±0.2 division against horizontal line.

c. Adjust the X CENT adjustment RV64 to the position spot at the center.

CALIBRATOR

(21) Check/adjust CAL terminal (0.5 Vp-p, 1 kHz).

a. Connect the CAL terminal to the digital multimeter, short the terminal 1 to 3 of the connector (P1201).

b. Check for the CAL output of 0.5 V, within 1 %.

c. Adjust the 0.5 V adjustment RV1207 for the CAL output of 0.495 to 0.505 V.

BATTERY CHARGER

㉒ Check/adjust battery charger.

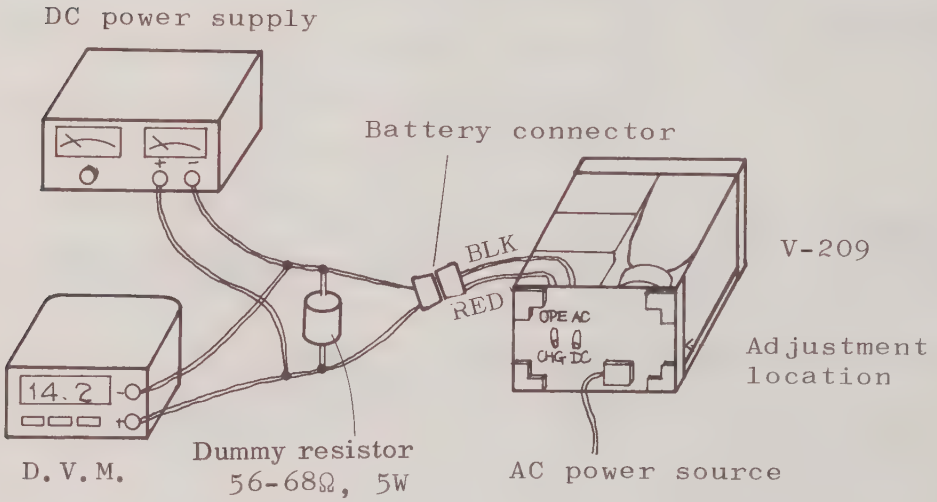
a. Remove the battery from the battery connector of V-209.

b. Connect the power supply, dummy resistor and digital voltmeter to the battery connector of V-209.
(Connection is shown in the following figure.)

c. Set the power source switch to the DC position and the charge-operation switch to the BATT CHARGE position.

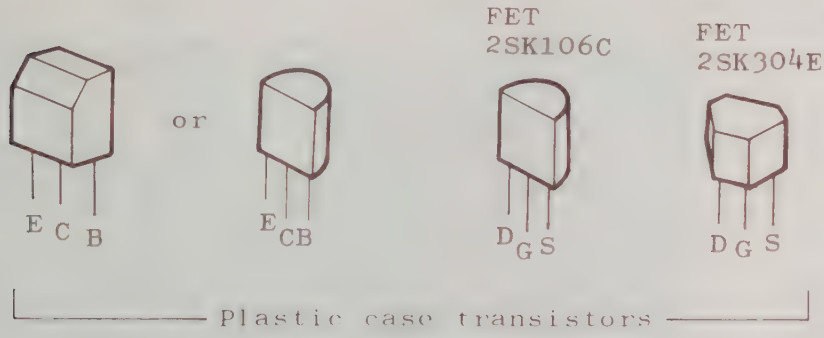
d. Set the voltage of the power supply to 14.2 V.

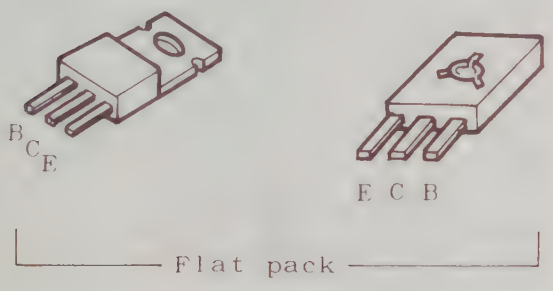
e. Adjust RV1501 so that the CHARGE lamp becomes dim.
(Prior to this adjustment check that the lamp is illuminated.)

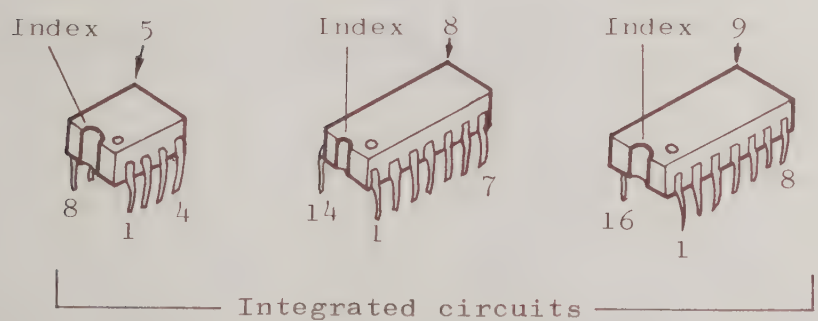


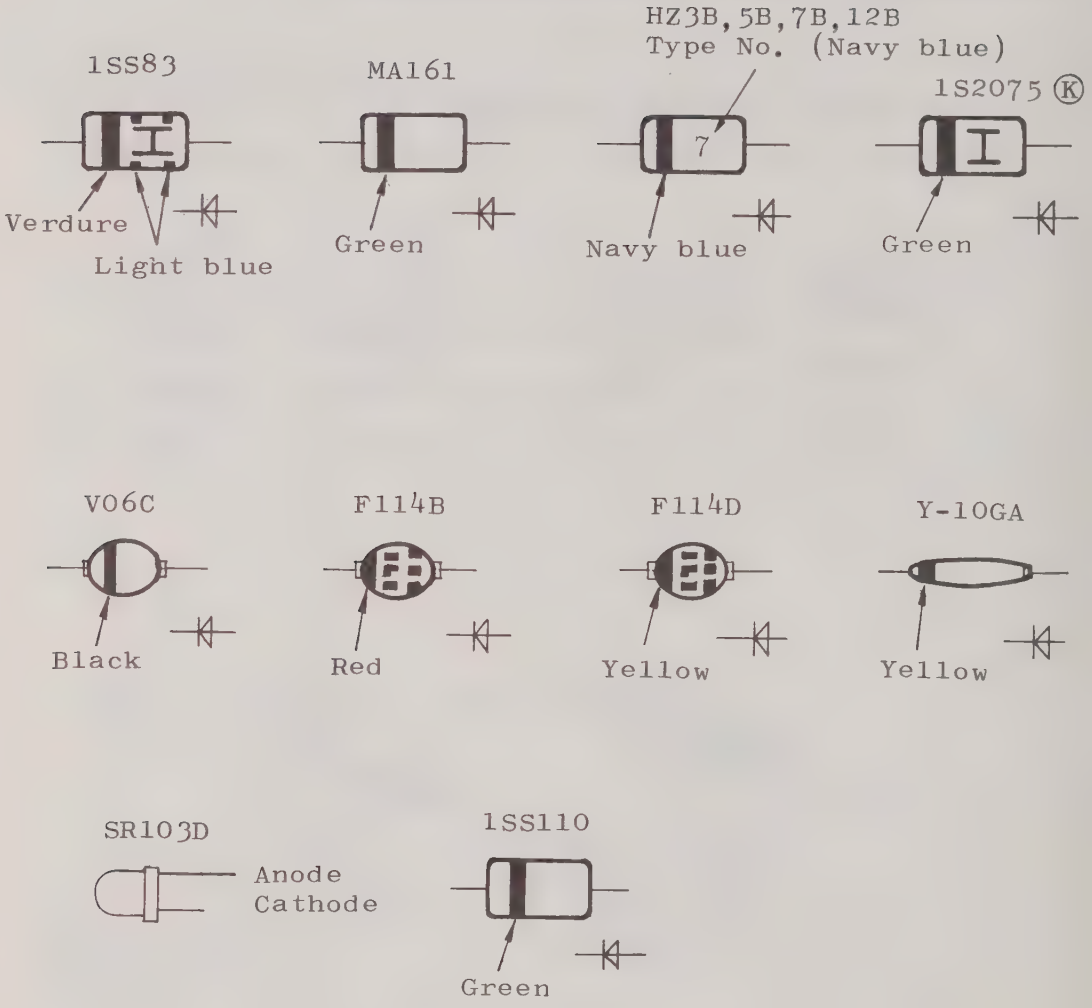
5. SEMICONDUCTOR LEAD CONFIGURATIONS

Lead configurations and case styles are typical, but may vary due to vendor changes or instrument modifications.

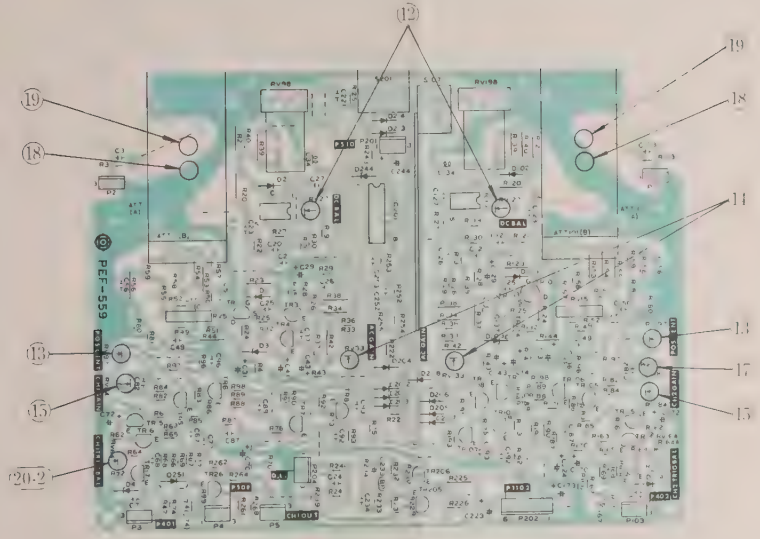




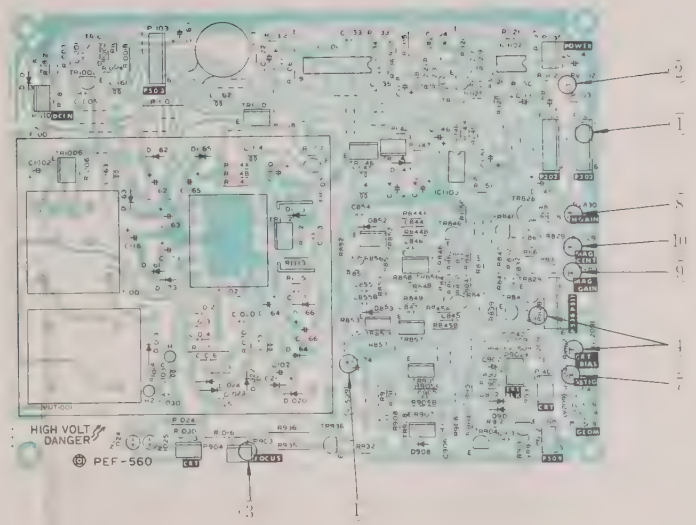



1SS83
Verdure
Light blue
MA161
Green
HZ3B,5B,7B,12B
Type No. (Navy blue)
7
Navy blue
1S2075 Ⓚ
Green
V06C
Black
F114B
Red
F114D
Yellow
Y-10GA
Yellow
SR103D
Anode
Cathode
1SS110
Green

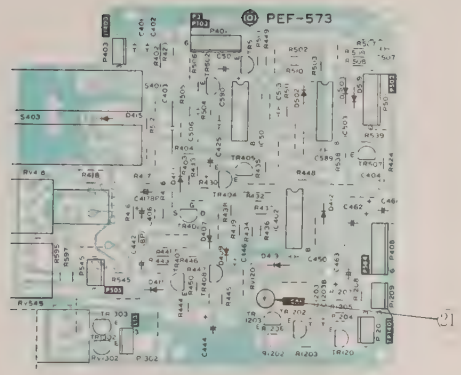
6. ELECTRICAL PARTS ARRANGEMENT



Vertical Preamplifier Board

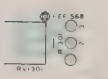


Power, Horizontal Output and Z-axis Circuits Board

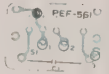


Trigger Circuit Board

Switch Board

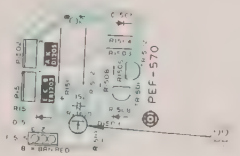


Intensity Control Board

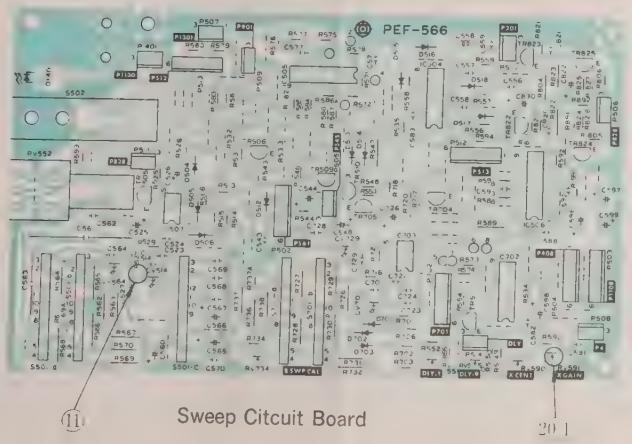


Input Coupling Board

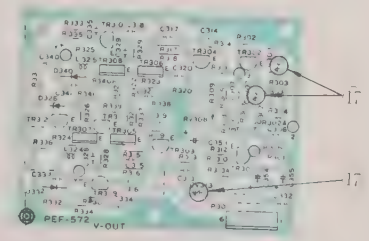
CRT Board



Battery Charger Board



Sweep Citcuit Board



Vertical Preamplifier Board

7. ELECTRICAL PARTS LIST
PEF-559 V. PRE

Part Code	Symbol	Description			Remarks
		Resistors			
RCE0614	R 3	Carbon	1/8W	47Ω ±5%	
RCE0649	19	Carbon	1/8W	22kΩ ±5%	
RME0828	20	Metal	1/4W	500kΩ ±0.5%	
RME0828	21	Metal	1/4W	500kΩ ±0.5%	
RCE0620	22	Carbon	1/8W	100Ω ±5%	
RSE0434	23	Solid	1/4W	10MΩ ±5%	
RCE0614	24	Carbon	1/8W	47Ω ±5%	
RCE0620	25	Carbon	1/8W	100Ω ±5%	
RCE0620	26	Carbon	1/8W	100Ω ±5%	
RME0945	27	Metal	1/8W	6.81kΩ ±1%	
RME0945	28	Metal	1/8W	5.62kΩ ±1%	
RCE0657	30	Carbon	1/8W	100kΩ ±5%	
RCE0657	31	Carbon	1/8W	100kΩ ±5%	
RCE0641	32	Carbon	1/8W	4.7kΩ ±5%	
RCE0620	29	Carbon	1/8W	100Ω ±5%	
RCE0631	33	Carbon	1/8W	680Ω ±5%	
RME0711	34	Metal	1/4W	60.0Ω ±1%	
RME0931	35	Metal	1/8W	475Ω ±1%	
RME0932	36	Metal	1/8W	562Ω ±1%	
RME1003	37	Metal	1/4W	600Ω ±0.5%	
RME0830	38	Metal	1/4W	16.0kΩ ±0.5%	
RME1004	39	Metal	1/4W	80kΩ ±0.5%	
RME0707	40	Metal	1/4W	4.00kΩ ±0.5%	
RCE0606	41	Carbon	1/8W	10Ω ±5%	
RCR3050	42	Carbon	1/4W	820Ω ±5%	
RCE0606	43	Carbon	1/8W	10Ω ±5%	
RCR3004	44	Carbon	1/4W	10Ω ±5%	
RCE0624	49	Carbon	1/8W	220Ω ±5%	
RCE0624	50	Carbon	1/8W	220Ω ±5%	
RCE0627	51	Carbon	1/8W	390Ω ±5%	
RCE0634	52	Carbon	1/8W	1.2kΩ ±5%	
RME1003	53	Metal	1/4W	600Ω ±0.5%	
RME0708	54	Metal	1/4W	300Ω ±0.5%	
RME1002	55	Metal	1/4W	180Ω ±0.5%	
RME1001	56	Metal	1/4W	120Ω ±0.5%	
RME1008	57	Metal	1/8W	301Ω ±1%	
RCE0618	58	Carbon	1/8W	75Ω ±5%	
RME1007	59	Metal	1/8W	200Ω ±1%	
RCE0624	61	Carbon	1/8W	220Ω ±5%	
RCE0645	62	Carbon	1/8W	10kΩ ±5%	
RCE0620	63	Carbon	1/8W	100Ω ±5%	
RME0942	64	Metal	1/8W	3.92kΩ ±1%	
RME0945	65	Metal	1/8W	6.81kΩ ±1%	
RME0927	66	Metal	1/8W	221Ω ±1%	
RCE0624	67	Carbon	1/8W	220Ω ±5%	
RME0938	68	Metal	1/8W	1.82kΩ ±1%	
RCE0635	69	Carbon	1/8W	1.5kΩ ±5%	
RCE0606	70	Carbon	1/8W	10Ω ±5%	
RCE0614	47	Carbon	1/8W	47Ω ±5%	
RCE0610	72	Carbon	1/8W	22Ω ±5%	
RCE0614	73	Carbon	1/8W	47Ω ±5%	
RCE0639	74	Carbon	1/8W	3.3kΩ ±5%	
RCE0614	75	Carbon	1/8W	47Ω ±5%	
RCE0610	76	Carbon	1/8W	22Ω ±5%	
RCE0645	80	Carbon	1/8W	10kΩ ±5%	
RCE0610	81	Carbon	1/8W	22Ω ±5%	
RCE0610	82	Carbon	1/8W	22Ω ±5%	
RCE0626	83	Carbon	1/8W	330Ω ±5%	
RCE0619	84	Carbon	1/8W	82Ω ±5%	
RME0943	85	Metal	1/8W	4.75kΩ ±1%	
RME0943	86	Metal	1/8W	4.75kΩ ±1%	
RCE0636	87	Carbon	1/8W	1.8kΩ ±5%	
RCE0636	88	Carbon	1/8W	1.8kΩ ±5%	

Part Code	Symbol	Description			Remarks
RCE0620	R 89	Carbon	1/8W	100Ω ±5%	
RME0933	90	Metal	1/8W	681Ω ±1%	
RME0933	91	Metal	1/8W	681Ω ±1%	
RME0939	92	Metal	1/8W	2.21kΩ ±1%	
RCE0617	96	Carbon	1/8W	68Ω ±5%	
RCE0645	97	Carbon	1/8W	10kΩ ±5%	
RCE0641	98	Carbon	1/8W	4.7kΩ ±5%	
RME0941	93	Metal	1/8W	3.32kΩ ±1%	
RCE0629	99	Carbon	1/8W	560Ω ±5%	
		Capacitors			
CCC1001	C 20	Ceramic	50V	8 pF ±0.5pF	
CCC1034	21	Ceramic	50V	68 pF ±5%	
CCD0217	23	Ceramic	500V	1000 pF +100 -10%	
CCC1014	25	Ceramic	50V	47 pF ±5%	
CCC0999	26	Ceramic	50V	5 pF ±5%	
CQA0091	27	Plastic	50V	1000 pF ±10%	
CES0036	29	Al Elyc	25V	22μF ±20%	
CES0033	31	Al Elyc	25V	100μF ±20%	
CES0033	41	Al Elyc	25V	100μF ±20%	
CES0033	43	Al Elyc	25V	100μF ±20%	
CCC1002	49	Ceramic	50V	10 pF ±0.5pF	
CCC1002	50	Ceramic	50V	10 pF ±0.5pF	
CCC1032	67	Ceramic	50V	82 pF ±5%	
CCC0997	68	Ceramic	50V	3 pF ±0.25pF	
CES0036	70	Al Elyc	25V	22μF ±20%	
CCC1034	71	Ceramic	50V	68 pF ±5%	
CES0036	72	Al Elyc	25V	22μF ±20%	
CCC1027	74	Ceramic	50V	220 pF ±10%	
CCC1007	56	Ceramic	50V	22 pF ±5%	
CCC1011	82	Ceramic	50V	33pF ±5%	
CCC1365	87	Ceramic	50V	680 pF ±10%	
CCC1365	89	Ceramic	50V	680 pF ±10%	
CCC1030	92	Ceramic	50V	10000 pF +80 -20%	
CCC0997	93	Ceramic	50V	3 pF ±0.25pF	
CQA0099	96	Plastic	50V	22000 pF ±10%	
		Var. Resistors			
RNC0032	RV 27	Metal	CR19RB	47kΩ	
RNT0235	64	Metal	TM64K(PH)	5kΩ	
8348450	84	Metal	CR29R	100Ω	
RNT0242	33	Metal	TM64K(PV2)	1kΩ	
RNT0240	97	Metal	TM64K(PH)	50kΩ	
RDE0003	98	Carbon	EVH-Y13K20B14		
		Coil			
TLF0052	L 34	FL3H	0.47μH	±20%	
		Transistors			
HTK0068	TR 1	2SK106C			
HTC0557	3	2SC1674K			
HTA0224	4	2SA1029 D			
HTC0167	5	2SC535-B			
HTC0167	6	2SC535-B			
HTA0224	7	2SA1029 D			
HTA0224	8	2SA1029 D			
HTA0224	15	2SA1029 D			
HTC0167	16	2SC535-B			
HTA0224	17	2SA1029 D			

Part Code	Symbol		Description			Remarks
			Diodes			
8385433	D	1	1SS110			
HDS0108		2	1S2075			
HDH0024		3	Zenner	HZ-3B		
HDH0024		4	Zenner	HZ-3B		
			Connectors			
JBX0468	P	2	171825-3			
JBX0468		3	171825-3			
JBX0468		4	171825-3			
			Attenuator			
RAA0029	ATT	1	ADR-255-1			
			Resistors			
RCE0614	R	103	Carbon	1/8W	47Ω ±5%	
RCE0649		119	Carbon	1/8W	22kΩ ±5%	
RME0828		120	Metal	1/4W	500kΩ ±1%	
RME0828		121	Metal	1/4W	500kΩ ±0.5%	
RCE0620		122	Carbon	1/8W	100Ω ±5%	
RSE0434		123	Solid	1/4W	10MΩ ±5%	
RCE0614		124	Carbon	1/8W	47Ω ±5%	
RCE0620		125	Carbon	1/8W	100Ω ±5%	
RCE0620		126	Carbon	1/8W	100Ω ±5%	
RME0945		127	Metal	1/8W	6.81kΩ ±5%	
RME0944		128	Metal	1/8W	5.62kΩ ±5%	
RCE0620		129	Carbon	1/8W	100Ω ±5%	
RCE0657		130	Carbon	1/8W	100kΩ ±5%	
RCE0657		131	Carbon	1/8W	100kΩ ±5%	
RCE0641		132	Carbon	1/8W	4.7kΩ ±5%	
RCE0631		133	Carbon	1/8W	680Ω ±5%	
RME0711		134	Metal	1/4W	60.0Ω ±0.5%	
RME0931		135	Metal	1/8W	475Ω ±1%	
RME0932		136	Metal	1/8W	562Ω ±1%	
RME1003		137	Metal	1/4W	600Ω ±0.5%	
RME0830		138	Metal	1/4W	16.0kΩ ±0.5%	
RME1004		139	Metal	1/4W	80kΩ ±0.5%	
RME0707		140	Metal	1/4W	4.00kΩ ±0.5%	
RCE0606		141	Carbon	1/8W	10Ω ±5%	
RCR3050		142	Carbon	1/4W	820Ω ±5%	
RCE0606		143	Carbon	1/8W	10Ω ±5%	
RCR3004		144	Carbon	1/4W	10Ω ±5%	
RCE0624		149	Carbon	1/8W	220Ω ±5%	
RCE0624		150	Carbon	1/8W	220Ω ±5%	
RCE0627		151	Carbon	1/8W	390Ω ±5%	
RCE0634		152	Carbon	1/8W	1.2kΩ ±5%	
RME1003		153	Metal	1/4W	600Ω ±0.5%	
RME0708		154	Metal	1/4W	300Ω ±0.5%	
RME1002		155	Metal	1/4W	180Ω ±0.5%	
RME1001		156	Metal	1/4W	120Ω ±0.5%	
RME1008		157	Metal	1/8W	301Ω ±1%	
RCE0618		158	Carbon	1/8W	75Ω ±5%	
RME1007		159	Metal	1/8W	200Ω ±1%	
RCE0624		161	Carbon	1/8W	220Ω ±1%	
RCE0645		162	Carbon	1/8W	10kΩ ±5%	
RCE0620		163	Carbon	1/8W	100Ω ±5%	
RME0944		164	Metal	1/8W	5.62kΩ ±1%	
RME0945		165	Metal	1/8W	6.81kΩ ±1%	
RME0927		166	Metal	1/8W	221Ω ±1%	
RCE0624		167	Carbon	1/8W	220Ω ±5%	
RME0938		168	Metal	1/8W	1.82kΩ ±1%	
RCE0635		169	Carbon	1/8W	1.5kΩ ±5%	
RCE0606		170	Carbon	1/8W	10Ω ±5%	
RCE0614		171	Carbon	1/8W	47Ω ±5%	

Part Code	Symbol		Description			Remarks
RCE0610	R	172	Carbon	1/8W	22Ω ±5%	
RCE0614		173	Carbon	1/8W	47Ω ±5%	
RCE0633		164	Carbon	1/8W	1kΩ ±5%	
RCE0614		175	Carbon	1/8W	47Ω ±5%	
RCE0610		176	Carbon	1/8W	22Ω ±5%	
RCE0645		180	Carbon	1/8W	10kΩ ±5%	
RCE0610		181	Carbon	1/8W	22Ω ±5%	
RCE0610		182	Carbon	1/8W	22Ω ±5%	
RCE0626		183	Carbon	1/8W	330Ω ±5%	
RCE0619		184	Carbon	1/8W	82Ω ±5%	
RME0943		185	Metal	1/8W	4.75kΩ ±5%	
RME0943		186	Metal	1/8W	4.75kΩ ±5%	
RCE0636		187	Carbon	1/8W	1.8kΩ ±5%	
RCE0636		188	Carbon	1/8W	1.8kΩ ±5%	
RCE0620		189	Carbon	1/8W	100Ω ±5%	
RME0934		190	Metal	1/8W	825Ω ±1%	
RME0934		191	Metal	1/8W	825Ω ±1%	
RME0939		192	Metal	1/8W	2.21kΩ ±1%	
RME0939		193	Metal	1/8W	2.21kΩ ±1%	
RME0941		194	Metal	1/8W	3.32kΩ ±1%	
RME0941		195	Metal	1/8W	3.32kΩ ±1%	
RCE0617		196	Carbon	1/8W	68Ω ±5%	
RCE0645		197	Carbon	1/8W	10kΩ ±5%	
RCE0641		198	Carbon	1/8W	4.7kΩ ±5%	
			Capacitors			
CQA0091	C	127	Plastic	50V	1000 pF ±10%	
CCC1034		121	Ceramic	50V	68 pF ±5%	
CCD0217		123	Ceramic	500V	1000 pF +100% -0%	
CCC1001		120	Ceramic	50V	8 pF ±0.5pF	
CCC1014		125	Ceramic	50V	47 pF ±5%	
CCC0999		126	Ceramic	50V	5 pF ±5%	
CES0036		129	Al Elyc	25V	22μF ±20%	
CES0033		141	Al Elyc	25V	100μF ±20%	
CES0033		143	Al Elyc	25V	100μF ±20%	
CCC1002		149	Ceramic	50V	10 pF ±0.5pF	
CCC1002		150	Ceramic	50V	10 pF ±0.5pF	
CCC1007		156	Ceramic	50V	22 pF ±5%	
CCC1032		167	Ceramic	50V	82 pF ±5%	
CCC0997		168	Ceramic	50V	3 pF ±0.25pF	
CES0033		131	Al Elyc	25V	100μF ±20%	
CCC1034		171	Ceramic	50V	68 pF ±5%	
CES0036		172	Al Elyc	25V	22μF ±20%	
CES0030		173	Al Elyc	25V	22μF ±20%	
CES0036		170	Al Elyc	25V	22μF ±20%	
CCC1002		182	Ceramic	50V	47 pF ±5%	
CCC1365		187	Ceramic	50V	680 pF ±5%	
CCC1365		189	Ceramic	50V	680 pF ±5%	
CCC1030		192	Ceramic	50V	10000 pF +80% -20%	
CCC1030		193	Ceramic	50V	10000 pF +80% -20%	
CQA0099		196	Plastic	50V	22000 pF ±10%	
			Coil			
TLF0052	L	134	FL3H	0.47μH	±20%	
			Var. Resistors			
RNC0032	RV	127	Metal	CR19RB	47kΩ	
RNT0242		133	Metal	TM64K(PV2)	1kΩ	
8348450		184	Metal	CR29R	100Ω	

Part Code	Symbol		Description				Remarks
RNT0240	RV	197	Metal	TM64K(PH)	50kΩ		
RDE0003		198	Carbon	EVH-Y13K20B14			
			Var. Capacitor				
CVE0027	CV	182	ECV-1ZW40X60				
			Transistors				
HTK0068	TR	101	2SK106C				
HTC0557		103	2SC1674K				
HTA0224		104	2SA1029 D				
HTC0167		105	2SC535-B				
HTC0167		106	2SC535-B				
HTA0224		107	2SA1029 D				
HTA0224		108	2SA1029 D				
HTA0224		109	2SA1029 D				
HTA0224		110	2SA1029 D				
HTA0224		115	2SA1029 D				
HTC0167		116	2SC535-B				
HTA0224		117	2SA1029 D				
			Diodes				
8385433	D	101	1SS110				
HDS0108		102	1S2075				
HDH0024		103	Zenner	HZ-3B			
HDH0024		104	Zenner	HZ-3B			
			IC				
ILT0041	IC	101	Analog	TL071CP			
RAA0029	ATT	101	Attenuator	ADR-255-1			
			Connectors				
JBX0468	P	102	171825-3				
JBX0468		103	171825-3				
			Switch				
8376780	S	107	PB	SPJ222N	(LOCK)		
			Resistors				
RME0943	R	221	Metal	1/8W	4.75kΩ	±1%	
RME0943		222	Metal	1/8W	4.75kΩ	±1%	
RME0662		225	Metal	1/8W	681Ω	±1%	
RME0929		229	Metal	1/8W	332Ω	±1%	
RME0929		230	Metal	1/8W	332Ω	±1%	
RME0929		231	Metal	1/8W	332Ω	±1%	
RME0929		232	Metal	1/8W	332Ω	±1%	
RCE0657		234	Carbon	1/8W	100kΩ	±5%	
		235	Not Used				
RCE0606		239	Carbon	1/8W	10Ω	±5%	
RCE0606		240	Carbon	1/8W	10Ω	±5%	
RCE0620		243	Carbon	1/8W	100Ω	±5%	
RCE0643		251	Carbon	1/8W	6.8kΩ	±5%	
RCE0624		252	Carbon	1/8W	220Ω	±5%	
RCE0624		253	Carbon	1/8W	220Ω	±5%	
RCE0620		254	Carbon	1/8W	100Ω	±5%	
RCE0620		255	Carbon	1/8W	100Ω	±5%	
			Capacitors				
CQA0097	C	221	Plastic	50V	10000pF	±10%	
CES0036		223	Al Elyc	25V	22μF	±20%	
CCC1025		234	Ceramic	50V	100pF	±10%	

Part Code	Symbol		Description				Remarks
			Capacitors				
CES0040	C	224	Al Elyc	50V	10μF	±20%	
CES0029		244	Al Elyc	10V	100μF	±20%	
			Diodes				
HDS0108	D	201	1S2075				
HDS0108		202	1S2075				
HDS0108		203	1S2075				
HDS0108		204	1S2075				
HDS0108		205	1S2075				
HDS0108		206	1S2075				
HDS0108		207	1S2075				
HDS0108		208	1S2075				
HDS0108		213	1S2075				
HDS0108		214	1S2075				
HDH0024		244	Zenner	HZ-3B			
			Transistors				
HTA0099	TR	205	2SA781K				
HTA0099		206	2SA781K				
			IC				
IDH0586	IC	201	HD74LS74AP				
			Switch				
3165210	S	201	Rotary	SBU 1025			
			Connectors				
JBX0468	P	201	171825-3				
JBX0470		202	171825-6				
JBX0468		204	171825-3				
119584	PEF-559		PCB	PB-10			

PEF-572 V. OUT

Part Code	Symbol		Description				Remarks
			Resistors				
RME0928	R	301	Metal	1/8W	267Ω	±1%	
RME0928		302	Metal	1/8W	267Ω	±1%	
RCE0620		303	Carbon	1/8W	100Ω	±5%	
		304	Not Used				
RCE0622		305	Carbon	1/8W	150Ω	±5%	
		306	Not Used				
RCE0617		307	Carbon	1/8W	68Ω	±5%	
RME0934		308	Metal	1/8W	825Ω	±1%	
RME0934		309	Metal	1/8W	825Ω	±1%	
RME0934		310	Metal	1/8W	825Ω	±1%	
RME0934		311	Metal	1/8W	825Ω	±1%	
RME0943		312	Metal	1/8W	3.32kΩ	±1%	
RME0938		313	Metal	1/8W	1.82kΩ	±1%	
RME0938		314	Metal	1/8W	1.82kΩ	±1%	

Part Code	Symbol	Description			Remarks
RME0684	R 315	Metal	1/4W	47.5kΩ ±1%	
RME0684	316	Metal	1/4W	47.5kΩ ±1%	
RME0684	317	Metal	1/4W	47.5kΩ ±1%	
RME0684	318	Metal	1/4W	47.5kΩ ±1%	
RCE0614	319	Carbon	1/8W	47Ω ±5%	
RCE0614	320	Carbon	1/8W	47Ω ±5%	
RCE0614	321	Carbon	1/8W	47Ω ±5%	
RCE0614	322	Carbon	1/8W	47Ω ±5%	
RCE0617	323	Carbon	1/8W	68Ω ±5%	
RCE0626	324	Carbon	1/8W	330Ω ±5%	
RCE0626	325	Carbon	1/8W	330Ω ±5%	
RME0922	310A	Metal	1/8W	82.5Ω ±1%	
RCE0614	326	Carbon	1/8W	47Ω ±5%	
RCE0614	327	Carbon	1/8W	47Ω ±5%	
RCE0614	328	Carbon	1/8W	47Ω ±5%	
RCE0614	329	Carbon	1/8W	47Ω ±5%	
RCE0637	330	Carbon	1/8W	2.2kΩ ±5%	
RCE0637	331	Carbon	1/8W	2.2kΩ ±5%	
RCE0637	332	Carbon	1/8W	2.2kΩ ±5%	
RCE0606	333	Carbon	1/8W	10Ω ±5%	
RME0923	334	Metal	1/8W	100Ω ±1%	
RME0923	335	Metal	1/8W	100Ω ±1%	
RCE0661	336	Carbon	1/8W	470kΩ ±5%	
RCE0628	337	Carbon	1/8W	470Ω ±5%	
RCE0647	338	Carbon	1/8W	15kΩ ±5%	
RCE0653	339	Carbon	1/8W	47kΩ ±5%	
RCE0640	340	Carbon	1/8W	3.9kΩ ±5%	
RCE0659	341	Carbon	1/8W	220kΩ ±5%	
		Var. Resistor			
RNT0244	RV 308	Metal	TM64K2(PV2)200		
		Capacitors			
	C 302	Not Used			
	303	Not Used			
CCC1032	305	Ceramic	50V	82 pF ±5%	
	306	Not Used			
CCC1034	307	Ceramic	50V	68 pF ±5%	
CCC1009	313	Ceramic	50V	27 pF ±5%	
CCC1013	314	Ceramic	50V	39 pF ±5%	
CCD0273	315	Ceramic	500V	2 pF ±0.25pF	
CCD0287	316	Ceramic	500V	4700 pF +100 -0%	
CCD0273	317	Ceramic	500V	2 pF ±0.25pF	
CCD0287	318	Ceramic	500V	4700 pF +100 -0%	
CCC1014	319	Ceramic	50V	47 pF ±5%	
CCC1014	320	Ceramic	50V	47 pF ±5%	
CCC1030	321	Ceramic	50V	10000 pF +80 -20%	
CCC1014	328	Ceramic	50V	47 pF ±5%	
CCC1014	329	Ceramic	50V	47 pF ±5%	
CCD0287	332	Ceramic	500V	4700 pF +100 -0%	
CCC1029	333	Ceramic	50V	1000 pF +80 -20%	
CCD0287	334	Ceramic	500V	4700 pF +100 -0%	
CCD0287	335	Ceramic	500V	4700 pF +100 -0%	
CCD0273	340	Ceramic	500V	2 pF ±0.25pF	
CQA0099	341	Plastic	50V	22000 pF ±10%	
CES0036	353	Al Elyc	25V	22μF ±20%	
CES0029	354	Al Elyc	10V	100μF ±20%	
CES0036	355	Al Elyc	25V	22μF ±20%	

Part Code	Symbol	Description		Remarks
		Var. Capacitors		
CVE0039	CV 303	ECV-1ZW 40X53N (250V 40pF)		
CVE0039	307	ECV-1ZW 40X53N (250V 40pF)		
8202005	313	ECV-1ZW20X53N (250V 20.5pF)		
		Coils		
TLE0086	L 324	EL0606	2.2μH ±10%	
TLE0086	325	EL0606	2.2μH ±10%	
		Diodes		
HDH0029	D 326	Zenner	HZ-5B	
HDS0108	332	1S2075		
HDS0108	340	1S2075		
		Transistors		
HTA0099	TR 301	2SA781K		
HTA0099	302	2SA781K		
HTC0192	303	2SC641K-C		
HTC0192	304	2SC641K-C		
HTC0669	305	2SC2912S		
HTC0669	306	2SC2912S		
HTA0258	307	2SA1210S		
HTA0258	308	2SA1210S		
HTA0099	309	2SA781K		
HTA0099	310	2SA781K		
HTC0470	311	2SC1890A-F		
HTA0224	312	2SA1029 D		
		Connector		
JBX0470	P 301	171825-6		
119584	PEF-572	PCB	PB-10	

PEF-573 TRIG

Part Code	Symbol	Description			Remarks
		Resistors			
RCR3104	R 402	Carbon	1/4W	470kΩ ±5%	
RCE0614	403	Carbon	1/8W	47Ω ±5%	
RCE0661	404	Carbon	1/8W	470kΩ ±5%	
RCE0643	406	Carbon	1/8W	6.8kΩ ±5%	
RCE0655	416	Carbon	1/8W	68kΩ ±5%	
RCE0644	418	Carbon	1/8W	8.2kΩ ±5%	
RCE0633	417	Carbon	1/8W	1kΩ ±5%	
RCE0617	423	Carbon	1/8W	68Ω ±5%	
RCE0627	424	Carbon	1/8W	390Ω ±5%	
RCE0614	430	Carbon	1/8W	47Ω ±5%	
RCE0631	432	Carbon	1/8W	680Ω ±5%	
RCE0633	433	Carbon	1/8W	1kΩ ±5%	
RCE0612	434	Carbon	1/8W	33Ω ±5%	
RCE0638	435	Carbon	1/8W	2.7kΩ ±5%	
RCE0638	436	Carbon	1/8W	2.7kΩ ±5%	

Part Code	Symbol		Description			Remarks
RCE0638	R	437	Carbon	1/8W	2.7kΩ	±5%
RCE0653		438	Carbon	1/8W	47kΩ	±5%
RCE0653		439	Carbon	1/8W	47kΩ	±5%
RCE0633		441	Carbon	1/8W	1kΩ	±5%
RCE0653		443	Carbon	1/8W	47kΩ	±5%
RCE0639		444	Carbon	1/8W	3.3kΩ	±5%
RCE0645		445	Carbon	1/8W	10kΩ	±5%
RCE0653		446	Carbon	1/8W	47kΩ	±5%
RCE0645		447	Carbon	1/8W	10kΩ	±5%
RCE0606		448	Carbon	1/8W	10Ω	±5%
RCE0606		449	Carbon	1/8W	10Ω	±5%
RCE0643		450	Carbon	1/8W	6.8kΩ	±5%
RCE0645		501	Carbon	1/8W	10kΩ	±5%
RCE0636		502	Carbon	1/8W	1.8kΩ	±5%
RCE0647		503	Carbon	1/8W	15kΩ	±5%
RCE0641		504	Carbon	1/8W	4.7kΩ	±5%
RCE0645		505	Carbon	1/8W	10kΩ	±5%
RCE0639		506	Carbon	1/8W	3.3kΩ	±5%
RCE0620		507	Carbon	1/8W	100Ω	±5%
RCE0620		508	Carbon	1/8W	100Ω	±5%
RCE0653		509	Carbon	1/8W	47kΩ	±5%
RCE0645		510	Carbon	1/8W	10kΩ	±5%
RCE0633		511	Carbon	1/8W	1kΩ	±5%
RCE0645		512	Carbon	1/8W	10kΩ	±5%
RCE0643		513	Carbon	1/8W	68kΩ	±5%
RCE0624		514	Carbon	1/8W	220Ω	±5%
			Var. Resistor			
RDE0003	RV	415	Carbon	EVH-Y13k20B14		
			Capacitors			
CCD0281	C	401	Ceramic	500V	33pF	±5%
CCD0252		402	Ceramic	500V	47pF	±5%
CQA0068		403	Plastic	4MFT-P473M(400V 0.047μF)		
CCC1020		404	Ceramic	50V	1000pF	+80% -20%
CES0036		406	Al Elyc	25V	22μF	±20%
CEC0176		417	Al Elyc	25V	10μF NP	
CES0036		425	Al Elyc	25V	22μF	±20%
CET0031		432	Al Elyc	50V	1μF	
CES0032		441	Al Elyc	25V	47μF	±20%
CCC1030		446	Ceramic	50V	10000pF	+80% -20%
CCC1030		450	Ceramic	50V	10000pF	+80% -20%
CES0036		461	Al Elyc	25V	22μF	±20%
CES0029		462	Al Elyc	10V	100μF	±20%
CES0036		463	Al Elyc	25V	22μF	±20%
CES0036		501	Al Elyc	25V	22μF	±20%
CCC1030		506	Ceramic	50V	10000pF	+80% -20%
CCC1014		507	Ceramic	50V	47pF	±5%
CCC1030		589	Ceramic	50V	10000pF	+80% -20%
CCC1030		590	Ceramic	50V	10000pF	+80% -20%
CQA0101		513	Plastic	50V	47000pF	±10%
			Diodes			
HDS0108	D	401	1S2075			
HDS0108		407	1S2075			
HDS0108		409	1S2075			
HDS0108		411	1S2075			
HDS0108		412	1S2075			
HDS0108		413	1S2075			
HDS0108		415	1S2075			
HDS0108		502	1S2075			
HDS0108		503	1S2075			

Part Code	Symbol		Description			Remarks
HDS0108	D	514	1S2075			
			Transistors			
HTK0068	TR	401	2SK106C			
HTC0167		404	2SC535-B			
HTC0167		405	2SC535-B			
HTA0224		407	2SA1029 D			
HTC0148		408	2SC458-C			
HTC0148		501	2SC458-C			
HTC0148		502	2SC458-C			
HTC0148		507	2SC458-C			
			IC's			
IDH3867	IC	432	Digital	HD74LS00P		
IDH3869		501	HD74LS74AP			
IDH3867		503	Digital	HD74LS00P		
			Switches			
8374067	S	401	Lever	SLR02402		
8374067		501	Lever	SLR02402		
			Transistors			
HTC0148	TR	1302	2SC458-C			
HTA0224		1303	2SA1029 D			
			Connectors			
JBX0470	P	401	171825-6			
JBX0468		402	171825-3			
JBX0470		408	171825-6			
JBX0470		501	171825-6			
JBX0468		502	171825-3			
			Resistors			
RCE0645	R	515	Carbon	1/8W	10kΩ	±5%
RCE0626		516	Carbon	1/8W	330Ω	±5%
RCE0633		517	Carbon	1/8W	1kΩ	±5%
			Var. Resistors			
3142131	RV	515	V16L4-N20KC B 2kΩ			
8348451		1302	Carbon	EVH-CCAS15B14 10kΩ		
JBX0468	P	515	Connector	171825-3		
119585	PCB	513	PCB	PB-11		
			Resistors			
RCE0648	R	1202	Carbon	1/8W	18kΩ	±5%
RCE0655		1203	Carbon	1/8W	68kΩ	±5%
RCE0657		1204	Carbon	1/8W	100kΩ	±5%
RCE0658		1205	Carbon	1/8W	150kΩ	±5%
RME0941		1207	Metal	1/8W	3.32kΩ	±1%
RME0928		1208	Metal	1/8W	267Ω	±1%
RCE0647		1206	Carbon	1/8W	15kΩ	±5%
			Capacitor			
CQA0099	C	1203	Plastic	50V	22000pF	±10%
			Transistors			
HTC0148	TR	1201	2SC458-C			
HTC0148		1202	2SC458-C			
HTA0224		1203	2SA1029 D			

Part Code	Symbol	Description	Remarks
		Var. Resistor	
8348450	RV 1207	Metal CR29R 1kΩ	
		Connector	
JBX0468	P 1209	171825-3	

PEF-566 SWEEP

Part Code	Symbol	Description	Remarks
		Resistors	
RCE0639	R 513	Carbon 1/8W 3.3kΩ ±5%	
RCE0643	514	Carbon 1/8W 6.8kΩ ±5%	
RCE0651	515	Carbon 1/8W 33kΩ ±5%	
RCE0653	516	Carbon 1/8W 47kΩ ±5%	
RCE0620	529	Carbon 1/8W 100Ω ±5%	
RME0937	531	Metal 1/8W 1.50kΩ ±1%	
RME0940	532	Metal 1/8W 2.67kΩ ±1%	
RCE0641	533	Carbon 1/8W 4.7kΩ ±5%	
RCE0610	535	Carbon 1/8W 22Ω ±5%	
RCE0628	543	Carbon 1/8W 470Ω ±5%	
RCE0655	544	Carbon 1/8W 68kΩ ±5%	
RCE0624	526	Carbon 1/8W 220Ω ±5%	
RCE0626	527	Carbon 1/8W 330Ω ±5%	
		Coil	
TLE0063	L 558	EL0606 33μH ±10%	
		Resistors	
RCE0633	R 556	Carbon 1/8W 1kΩ ±5%	
RCE0640	557	Carbon 1/8W 3.9kΩ ±5%	
RCE0628	558	Carbon 1/8W 470Ω ±5%	
RCE0647	559	Carbon 1/8W 15kΩ ±5%	
RMS0023	562	Metal 1/4W 1.43MΩ ±0.5%	
RMS0024	563	Metal 1/4W 715kΩ ±0.5%	
RME0699	564	Metal 1/4W 429kΩ ±0.5%	
RME0718	565	Metal 1/4W 143kΩ ±0.5%	
RME0717	566	Metal 1/4W 71.5kΩ ±0.5%	
RME0717	567	Metal 1/4W 71.5kΩ ±0.5%	
RME0945	579	Metal 1/8W 6.81kΩ ±1%	
RME0942	580	Metal 1/8W 3.92kΩ ±1%	
RCE0606	581A	Carbon 1/8W 10Ω ±5%	
RCE0606	589A	Carbon 1/8W 10Ω ±5%	
RCE0639	571	Carbon 1/8W 3.3kΩ ±5%	
RCE0640	578	Carbon 1/8W 3.9kΩ ±5%	
RCE0653	582	Carbon 1/8W 47kΩ ±5%	
RCE0641	588	Carbon 1/8W 4.7kΩ ±5%	
RCE0645	590	Carbon 1/8W 10kΩ ±5%	
RCE0643	591	Carbon 1/8W 6.8kΩ ±5%	

Part Code	Symbol	Description	Remarks
		Capacitors	
CCC1002	C 514	Ceramic 50V 10pF ±0.5pF	
CCC1027	543	Ceramic 50V 220pF ±10%	
CCC1004	523	Ceramic 50V 39pF ±5%	
CCC0997	524	Ceramic 50V 3pF ±0.25pF	
CCC1030	556	Ceramic 50V 10000pF +80% -20%	
CCC1014	557	Ceramic 50V 47pF ±5%	
CCC1027	558	Ceramic 50V 220pF ±10%	
CCC1027	559	Ceramic 50V 220pF ±10%	
CES0036	560	Al Elyc 25V 22μF ±20%	
3142077	561	Plastic 1μF+0.01μF D 100V	
CES0036	525	Al Elyc 25V 22μF ±20%	
CES0036	526	Al Elyc 25V 22μF ±20%	
CCC1025	527	Ceramic 50V 100pF ±10%	
3142077	563	Plastic 1μF+0.01μF D 100V	
CCC1034	564	Ceramic 50V 68pF ±5%	
CES0040	565	Al Elyc 50V 10μF ±20%	
CES0037	566	Al Elyc 50V 1μF ±20%	
CQA0103	567	Plastic 50V 0.1μF ±10%	
CQA0097	568	Plastic 50V 10000pF ±10%	
CQA0091	569	Plastic 50V 1000pF ±10%	
CCC1030	583	Ceramic 50V 10000pF ±20%	
CCC1030	588	Ceramic 50V 10000pF +80% -20%	
CCC1014	591	Ceramic 50V 47pF ±5%	
CCC1030	592	Ceramic 50V 10000pF +80% -20%	
CES0036	597	Al Elyc 25V 22μF ±20%	
CES0029	598	Al Elyc 10V 100μF ±20%	
CES0036	599	Al Elyc 25V 22μF ±20%	
		Resistor	
RCE0639	R 590B	Carbon 1/8W 3.3kΩ ±5%	
		Var. Resistor	
8348450	RV 591	Metal CR29R 470Ω	
		Var. Capacitor	
CVE0026	CV 564	ECV-1ZW20X60	
		Diodes	
HDM0051	D 504	MA161	
HDM0051	505	MA161	
HDM0051	506	MA161	
HDS0108	512	1S2075	
HDS0108	515	1S2075	
HDS0108	516	1S2075	
HDS0108	517	1S2075	
HDS0108	518	1S2075	
		Transistors	
HTC0167	TR 505	2SC535-B	
HTC0148	506	2SC458-C	
		IC's	
IDH0646	IC 504	Digital HD74LS02P	
IDH0802	506	Digital HD14053BP	
ILT0052	507	Analog TL080CP	
		Switch	
8374085	S 501	Rotary S21P 3319	

Part Code	Symbol	Description			Remarks
		Resistors			
RCE0633	R 593	Carbon	1/8W	1kΩ ±5%	
RCE0657	594	Carbon	1/8W	100kΩ ±5%	
RCE0645	598	Carbon	1/8W	10kΩ ±5%	
RME0944	801	Metal	1/8W	5.62kΩ ±1%	
RME0665	804	Metal	1/4W	1.21kΩ ±1%	
RCE0614	805	Carbon	1/8W	47Ω ±5%	
RCE0614	806	Carbon	1/8W	47Ω ±5%	
RME0939	820	Metal	1/8W	2.21kΩ ±1%	
RME0939	821	Metal	1/8W	2.21kΩ ±1%	
RME0666	822	Metal	1/4W	1.50kΩ ±1%	
RME0666	823	Metal	1/4W	1.50kΩ ±1%	
RCE0614	824	Carbon	1/8W	47Ω ±5%	
RCE0614	825	Carbon	1/8W	47Ω ±5%	
RCE0637	826	Carbon	1/8W	2.2kΩ ±5%	
RCE0637	827	Carbon	1/8W	2.2kΩ ±5%	
RCE0614	891	Carbon	1/8W	47Ω ±5%	
RCE0612	892	Carbon	1/8W	33Ω ±5%	
		Capacitors			
CCC1030	C 593	Ceramic	50V	10000pF +80% -20%	
CES0036	822	Al Elyc	25V	22μF +20%	
CES0036	830	Al Elyc	25V	22μF +20%	
		Transistors			
HTC0148	TR 822	2SC458-C			
HTC0148	823	2SC458-C			
HTA0224	824	2SA1029 D			
HTA0224	825	2SA1029 D			
3142080	RV552	16 type 10kB+50kB with SW			
		Connectors			
JBX0470	P 513	171825-6			
JBX0470	512	171825-6			
JBX0470	502	171825-6			
JBX0470	503	171825-6			
JBX0470	504	171825-6			
JBX0468	505	171825-3			
JBX0468	506	171825-3			
JBX0468	508	171825-3			
JBX0468	509	171825-3			
JBX0468	510	171825-3			
JBX0468	507	171825-3			
JBX0468	511	171825-3			
JBX0468	1401	171825-3			
HDS0408	D 1401	Diode	SR503D with mount (red)		
119585	PEF566	PCB	PB-11		

PEF-560 H. HV. LV

Part Code	Symbol	Description			Remarks
		Resistors			
RME0959	R 828	Metal	1/8W	100kΩ ±1%	
RME0959	829	Metal	1/8W	100kΩ ±1%	
RCE0640	830	Carbon	1/8W	3.9kΩ ±5%	
RCE0626	831	Carbon	1/8W	330Ω ±5%	
RCE0649	832	Carbon	1/8W	22kΩ ±5%	
RCE0622	838	Carbon	1/8W	150Ω ±5%	
RME0959	840	Metal	1/8W	100kΩ ±1%	
RME0959	841	Metal	1/8W	100kΩ ±1%	
RME1010	842	Metal	1/8W	5.11kΩ ±1%	
RMF1010	843	Metal	1/8W	5.11kΩ ±1%	
RCE0639	846	Carbon	1/8W	3.3kΩ ±5%	
RCE0639	847	Carbon	1/8W	3.3kΩ ±5%	
RCE0660	848	Carbon	1/8W	330kΩ ±5%	
RCE0660	849	Carbon	1/8W	330kΩ ±5%	
RCE0647	850	Carbon	1/8W	15kΩ ±5%	
RCE0647	851	Carbon	1/8W	15kΩ ±5%	
RCE0635	852	Carbon	1/8W	1.5kΩ ±5%	
RCE0635	853	Carbon	1/8W	1.5kΩ ±5%	
RME0721	844A	Metal	1/4W	182kΩ ±1%	
RME0702	844B	Metal	1/4W	200kΩ ±0.5%	
RME0721	845A	Metal	1/4W	182kΩ ±1%	
RME0702	845B	Metal	1/4W	200kΩ ±0.5%	
RCE0641	839	Carbon	1/8W	4.7kΩ ±5%	
RCE0624	856	Carbon	1/8W	220Ω ±5%	
RCE0624	857	Carbon	1/8W	220Ω ±5%	
RCE0605	858	Carbon	1/8W	6.8Ω ±5%	
RCE0605	859	Carbon	1/8W	6.8Ω ±5%	
RCE0614	862	Carbon	1/8W	47Ω ±5%	
RCE0614	863	Carbon	1/8W	47Ω ±5%	
RCE0660	860	Carbon	1/8W	330kΩ ±5%	
		Var. Resistors			
RNT0243	RV 829	Metal	TM64K2(PH) 20K		
RNT0239	830	Metal	TM64K(PH) 2kΩ		
RNT0234	831	Metal	TM64K(PH) 200Ω		
		Capacitors			
CCC1162	C 832	Ceramic	50V	470pF ±10%	
CCC0111	844	Ceramic	500V	0.5pF ±0.25pF	
CCC0111	845	Ceramic	500V	0.5pF ±0.25pF	
CCD0287	846	Ceramic	500V	4700pF +100% -0%	
CCD0287	847	Ceramic	500V	4700pF +100% -0%	
CCD0287	854	Ceramic	500V	4700pF +100% -0%	
CCD0287	855	Ceramic	500V	4700pF +100% -0%	
CEC0213	855B	Al Elyc	160V	1μF ±20%	
CCC1025	860	Ceramic	50V	100pF ±10%	
		Diodes			
HDS0108	D 852	1S2075			
HDS0108	853	1S2075			
		Transistors			
HTA0224	TR 828	2SA1029 D			
HTA0224	829	2SA1029 D			
HTA0224	840	2SA1029 D			
HTA0224	841	2SA1029 D			
HTA0224	846	2SA1029 D			
HTA0224	847	2SA1029 D			
HTA0258	852	2SA1210S			
HTA0258	853	2SA1210S			
HTC0669	856	2SC2912S			
HTC0669	857	2SC2912S			

Part Code	Symbol	Description			Remarks
		Var. Resistor			
RNT0241	RV 1042	Metal	TM64K(PH)	200kΩ	
		Resistor			
RME0935	R 1402	Metal	1/8W	1kΩ ±1%	
		Capacitors			
	C 1042				
CCD0287	1042	Ceramic	500V	4700 pF +100 -0%	
		Connectors			
JBX0470	P 828	171825-6			
JBX0468	1401	171825-3			
		Resistors			
RME0942	R 901	Metal	1/8W	3.92kΩ ±1%	
RME0947	902	Metal	1/8W	10kΩ ±1%	
RCE0658	903	Carbon	1/8W	150kΩ ±5%	
RCE0641	904	Carbon	1/8W	4.7kΩ ±5%	
RME0688	905A	Metal	1/4W	100kΩ ±1%	
RME0688	905B	Metal	1/4W	100kΩ ±1%	
RCE0661	906	Carbon	1/8W	470kΩ ±5%	
RCE0649	907	Carbon	1/8W	22kΩ ±5%	
RCE0633	908	Carbon	1/8W	1kΩ ±5%	
RCE0624	910	Carbon	1/8W	220Ω ±5%	
RCE0606	911	Carbon	1/8W	10Ω ±5%	
RCE0620	912	Carbon	1/8W	100Ω ±5%	
RCE0643	921	Carbon	1/8W	6.8kΩ ±5%	
RCE0653	931	Carbon	1/8W	47kΩ ±5%	
RCE0653	932	Carbon	1/8W	47kΩ ±5%	
RMV0005	935	Metal	1/2W	10MΩ ±5%	
RCR4275	936	Carbon	1/2W	1.5MΩ ±5%	
		Capacitors			
CES0036	C 902	Al Elyc	25V	22μF ±20%	
CCD0272	905	Ceramic	500V	1 pF ±0.25pF	
CCD0287	906	Ceramic	500V	4700 pF +100 -0%	
CCD0287	911	Ceramic	500V	4700 pF +100 -0%	
		Diodes			
HDS0108	D 901	1S2075			
HDS0108	902	1S2075			
HDS0108	908	1S2075			
		Transistors			
HTC0192	TR 901	2SC641K-C			
HTC0148	904	2SC458-C			
HTC0669	905	2SC2912S			
HTA0258	908	2SA1210S			
HTA0104	936	2SA778A K			
		Connectors			
JBX0468	P 901	171825-3			
JBX0468	902	171825-3			
JBX0468	903	171825-3			
		Capacitors			
CQA0101	C 1001	Plastic	50V	47000 pF ±10%	
CES0033	1002	Al Elyc	25V	100μF ±20%	
CQA0101	1005	Plastic	50V	47000 pF ±10%	
CCD0231	1012	Ceramic	2000V	4700 pF +80 -20%	

Part Code	Symbol	Description			Remarks
CCD0231	C 1013	Ceramic	2000V	4700 pF +80 -20%	
CCD0231	1014	Ceramic	2000V	4700 pF +80 -20%	
CCD0245	1016	Ceramic	2000V	100 pF ±10%	
CCD0286	1020	Ceramic	500V	1000 pF +100 -0%	
CEC0213	1021	Al Elyc	160V	1μF	
CCD0231	1023	Ceramic	2000V	4700 pF +80 -20%	
CCD-231	1025	Ceramic	2000V	4700 pF +80 -20%	
		Resistors			
RMS0022	R 1001B	Metal	1/4W	1.21MΩ ±1%	
RCE0655	1001	Carbon	1/8W	68kΩ ±5%	
RCE0660	1002	Carbon	1/8W	330kΩ ±5%	
RCE0637	1003	Carbon	1/8W	2.2kΩ ±5%	
RCE0635	1004	Carbon	1/8W	1.5kΩ ±5%	
RCE0614	1006	Carbon	1/8W	47Ω ±5%	
RCE0645	1014	Carbon	1/8W	10kΩ ±5%	
RMV0004	1015	Metal	1/2W	22.1MΩ ±1%	
RCR3213	1016	Carbon	1/2W	1MΩ ±5%	
RCE0660	1020	Carbon	1/8W	330kΩ ±5%	
RSE0434	1024	Solid	1/4W	10MΩ ±5%	
		Var. Resistor			
RNT0241	RV 1021	Metal	TM64K(PH)	200kΩ	
		Diodes			
HDY0031	D 1013	Y10GA			
HDH0040	1020	Zenner	HZ7(B)		
HDS0250	1021	1SS83			
HDS0250	1022	1SS83			
HDS0250	1023	1SS83			
HDS0250	1024	1SS83			
		Transistors			
HTK0068	TR 1001	2SK106C			
HTA0224	1002	2SA1029 D			
HTC0032	1006	2SC1061-C			
3142165	T 1001	XFMR	D#3142165		
EFL0016	F 1001	Fuse	FR-11 125V 1A		
		Lamps			
ELL0019	NL 1024	NE-2			
ELL0019	1025	NE-2			
		Connector			
JBX0468	P 904	171825-3			
		Diodes			
HDV0019	D 1101	V06C			
HDS0250	1113	1SS83			
HDH0019	1147	Zenner	HZ12 (B)		
HDF0041	1161	F114B			
HDS0250	1162	1SS83			
HDF0041	1163	F114B			
HDF0041	1164	F114B			
HDS0250	1165	1SS83			
HDF0041	1166	F114B			
HDF0042	1173	F114D			

Part Code	Symbol		Description				Remarks
			IC's				
ILH0119	IC	1102	Analog	HA17903PS			
ILH0120		1103	Analog	HA17904PS			
ILM0319		1101	UPC1042C				
			Transistors				
HTC0054	TR	1110	2SC1212AC				
HTC0670		1112	2SC2334L				
HTC0054		1141	2SC1212AC				
HTC0054		1146	2SC1212AC				
HTC0148		1102	2SC458-C				
HTA0083		1107	2SA673AC				
HDH0019	D	1147	HZ12B				
			Capacitors				
CQA0097	C	1102	Plastic	50V	10000pF	±10%	
CCC1027		1104	Ceramic	50V	220pF	±10%	
CQA0092		1106	Plastic	50V	1500pF	±10%	
CES0147		1110	Al Elyc	SM50VB330(M)			
CES0036		1114	Al Elyc	25V	22μF	±20%	
CQA0092		1115	Plastic	50V	1500pF	±10%	
CQA0047		1113	Plastic	AMR472K250			
CES0040		1118	Al Elyc	50V	10μF	±20%	
CQA0103		1030	Plastic	50V	0.1μF	±10%	
CES0040		1122	Al Elyc	50V	10μF	±20%	
CES0037		1130	Al Elyc	50V	1μF	±20%	
CQA0091		1133	Ceramic	50V	1000pF	±10%	
CQA0091		1134	Plastic	50V	1000pF	±10%	
CQA0095		1135	Plastic	50V	47000pF	±10%	
CES0036		1141	Al Elyc	25V	22μF	±20%	
CES0033		1151	Al Elyc	25V	100μF	±20%	
CES0036		1142	Al Elyc	25V	22μF	±20%	
CES0036		1146	Al Elyc	25V	22μF	±20%	
CES0033		1147	Al Elyc	25V	100μF	±20%	
CES0145		1162	Al Elyc	50V	100μF	±20%	
CES0145		1163	Al Elyc	50V	100μF	±20%	
CES0145		1164	Al Elyc	50V	100μF	±20%	
CES0145		1165	Al Elyc	50V	100μF	±20%	
CES0145		1166	Al Elyc	50V	100μF	±20%	
CEK0065		1161	Al Elyc	100V	10μF	±20%	
CEK0065		1167	Al Elyc	100V	10μF	±20%	
CES0033		1168	Al Elyc	25V	100μF	±20%	
CEU0002		1173	Al Elyc	200V	3.3μF	±20%	
CEU0002		1174	Al Elyc	200V	3.3μF	±20%	
CQA0099		1182	Plastic	50V	22000pF	±10%	
			Coils				
TLE0034	L	1161	FL5H	220μH		±10%	
TLE0076		1162	EL0606	100μH		±10%	
TLF0004		1163	FL7H	100μH	±10%		
TLF0004		1141	FL7H	100μH	±10%		
TLF0004		1147	FL7H	100μH	±10%		
TLF0020		1173	FL7H	1μH	±5%		
TLF0063		1114	EL0606	33μH	±10%		
TLS0016		1117	SN-8S-400				
TLE0063		1030	EL0606	33μH	±10%		
			Resistors				
RCE0655	R	1101	Carbon	1/8W	68kΩ	±5%	
RME0947		1102	Metal	1/8W	10kΩ	±1%	
RME0947		1103	Metal	1/8W	10kΩ	±1%	
RME1010		1104	Metal	1/8W	5.11kΩ	±1%	
RME0731		1105	Metal	1/4W	158kΩ	±1%	
RCE0649		1106	Carbon	1/8W	22kΩ	±5%	

Part Code	Symbol		Description				Remarks
RCE0620	R	1107	Carbon	1/8W	100Ω	±5%	
RCE0626		1108	Carbon	1/8W	330Ω	±5%	
RMR2766		1110	Metal	1W	22Ω	±5%	
RCE0610		1112	Carbon	1/8W	22Ω	±5%	
RCR3016		1113	Carbon	1/4W	33Ω	±5%	
RCR3016		1114A	Carbon	1/4W	33Ω	±5%	
RCE0614		1115	Carbon	1/8W	47Ω	±5%	
RCR3016		1114B	Carbon	1/4W	33Ω	±5%	
RMS0022		1001B	Metal	1/4W	1.21MΩ	±1%	
RCE0614		1118	Carbon	1/8W	47Ω	±5%	
RME0954		1119	Metal	1/8W	39.2kΩ	±1%	
RME0949		1120	Metal	1/8W	15.0kΩ	±1%	
RCE0602		1030	Carbon	1/8W	2.2Ω	±5%	
RCE0657		1121	Carbon	1/8W	100kΩ	±5%	
RME0949		1122	Metal	1/8W	15.0kΩ	±1%	
RME0637		1123	Carbon	1/8W	2.2kΩ	±1%	
RME0949		1124	Metal	1/8W	15.0kΩ	±1%	
RCE0647		1125	Carbon	1/8W	15kΩ	±5%	
RCE0643		1126	Carbon	1/8W	6.8kΩ	±5%	
RCE0653		1127	Carbon	1/8W	47kΩ	±5%	
RCE0659		1128	Carbon	1/8W	220kΩ	±5%	
RCE0655		1129	Carbon	1/8W	68kΩ	±5%	
RCE0659		1130	Carbon	1/8W	220kΩ	±5%	
RME0949		1131	Metal	1/8W	15.0kΩ	±1%	
RME0947		1132	Metal	1/8W	10kΩ	±1%	
RCE0661		1133	Carbon	1/8W	470kΩ	±5%	
RCE0657		1136	Carbon	1/8W	100kΩ	±5%	
RCE0631		1137	Carbon	1/8W	680Ω	±5%	
RCE0624		1142	Carbon	1/8W	220Ω	±5%	
RME0947		1144	Metal	1/8W	10kΩ	±1%	
RME0947		1145	Metal	1/8W	10kΩ	±5%	
RCE0620		1146	Carbon	1/8W	100Ω	±5%	
RCE0633		1147	Carbon	1/8W	1kΩ	±5%	
RME0688		1150	Metal	1/4W	100kΩ	±1%	
RME0947		1151	Metal	1/8W	10kΩ	±1%	
RCE0661		1181	Carbon	1/8W	470kΩ	±5%	
RCE0645		1182	Carbon	1/8W	10kΩ	±5%	
			Var. Resistor				
RNT0235	RV	1102	Metal	TM64K(PH) 5kΩ			
8380273B	T	1102	XFMR	Converter ST-20			
			Connectors				
JBX0470	P	1101	171825-6				
JBX0470		1102	171825-6				
JBX0470		1103	171825-6				
JBX0468		1130	171825-3				
JBX0468		1110	171825-3				
119584	PEF-560		PCB	PB-10			

CHASSIS

Part Code	Symbol	Description	Remarks
DPH0005	V 1101	CRT 95MB31 (H6102-P31)	
8374082	L 1101	Coil Trace Rotation	
HTC0032	TR 1503	Transistor 2SC1061-C	
8376777	T 1401	XFMR	
CES0144	C 1401	Al Elyc 35V 2200μF ±20%	
HDS0450	D 1401	Diode S4VB-10	
		Var. Resistor	
RDE0028	RV 1401	Carbon EVM-R7GS20B26	
		Resistor	
RCR3076	R 1401	Carbon 1/4W 10kΩ ±5%	
JHB0088	J 1404	Coax. Con BNC071	
JJC0026	J 1411	Jack CM3 (C-170)	
JPS0033	1412	Connector S-16930	
8338351	TP 1402	Terminal Z-048	
EFG0344		Fuse MF61NM 1 (1A 250V) JIS	
EFH0193	F 1401	Socket, Fus SN-1301	
EFG0352		Fuse MF61NM 2 (2A 250V) JIS	
EFH0193	F 1402	Socket, Fus SN-1301	
BSE0001		Wire 0.75SQ	
BBA0465		Wire PVC DL-1015 #22 YEL	
BBE0028		Wire PVC UL-1007 #24 YEL	
BBE0035		Wire PVC UL-1007 #24 BLK	
BBA0062		Wire WL1H 12/0.18 GRN	
BBA0060		Wire WL1H 12/0.18 BRN	
BBA0040		Wire WL1H 12/0.18 YEL	
BBE0026		Wire PVC UL-1007 #24 RED	
BBA0029		Wire WL1H 12/0.18 RED	
BBA0041		Wire WL1H 12/0.18 BLK	
BBA0043		Wire WL1H 12/0.18 WHT	
		Terminals	
324662		B5	
324662		D3	
3169393		Connector Assembly	
3169394			
JHB0088	J 1401	Coax. Con BNC071	
JHB0088	1402	Coax. Con BNC071	
JHB0088	1403	Coax. Con BNC071	
JHB0088	1405	Coax. Con BNC071	
SST0071	S 1401	Switch Toggle 8A2011	
SST0071	1402	Switch Toggle 8A2011	
HDS0408	D 1505	Diode SR503D with mount (red)	
4114183	TP 1401	Terminal BLK	
CCC1162	C 1205	Ceramic 50V 470pF ±10%	

PEF-561, 562 INPUT

Part Code	Symbol	Description	Remarks
		Capacitor	
CQX0068	C 1	Plastic 400V 0.047μF ±20%	
		Switch	
SSV0042	S 1	Slide SSB023 1=9 NS PCB	
119584	PEF-561	PCB PB-10	
		Capacitor	
CQX0068	C 101	Plastic 400V 0.047μF ±20%	
		Switch	
SSV0042	S 101	Slide SSB023 L=9 NS PCB	
119584	PEF-562	PCB PB-10	

PEF-564, PEF-571 CRT

Part Code	Symbol	Description	Remarks
		Socket	
JSP0001	J 1101	PS-085	
		Connectors	
JBX0468	P 1030	171825-3	
JBX0468	1031	171825-3	
JBX0468	1032	171825-3	
119584	PEF-571	PCB PB-10	
		Diodes	
HDH0072	D 1191	HZ22	
HDH0072	1192	HZ22	
		Resistors	
RCE0661	R 1191	Carbon 1/8W 470kΩ ±5%	
RCE0661	1192	Carbon 1/8W 470kΩ ±5%	
		Capacitors	
CCC1029	C 1191	Ceramic 50V 1000pF +80% -20%	
CCC1029	C 1192	Ceramic 50V 1000pF +80% -20%	

PEF-568 INTEN

Part Code	Symbol	Description	Remarks
		Var. Resistor	
8369340	RV 1301	Carbon V12LG3N20KC 10KB+10KB	
		Resistor	
RCE0637	R 1301	Carbon 1/8W 2.2kΩ ±5%	
119585	PEF-568	PCB PB-11	

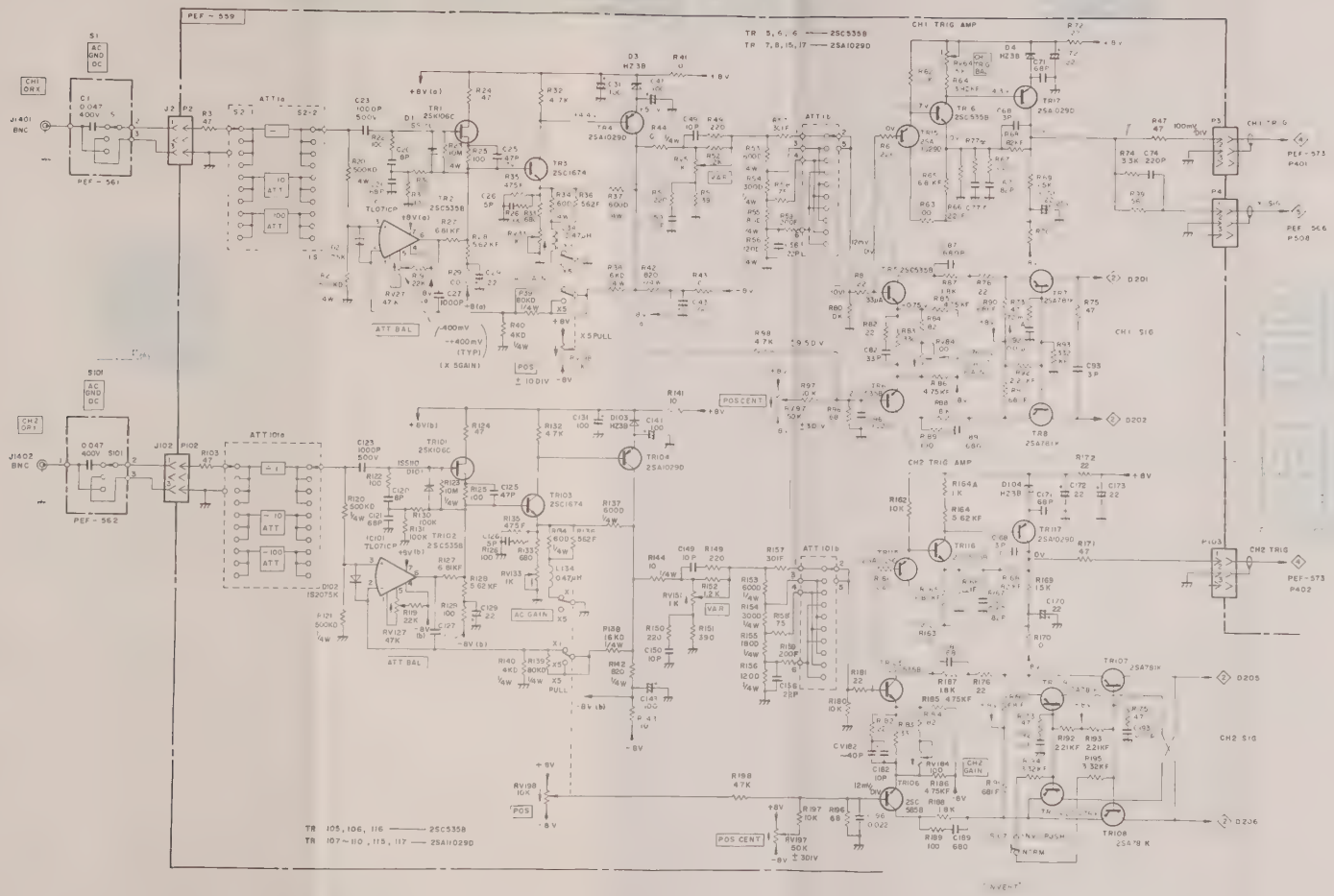
PEF-569 PS SW

Part Code	Symbol	Description	Remarks
		Switches	
SST0071	S 1403	Toggle 8A2011	
SST0071	1404	Toggle 8A2011	
HDS0108	D 1405	Diode 1S2075	
RMR2768	R 1405	Resistor, Metal RSF1B 47ΩJ	
RMR2770	R 1405	Metal 1W 100Ω ±5%	
119585	PEF-569	PCB PB-11	

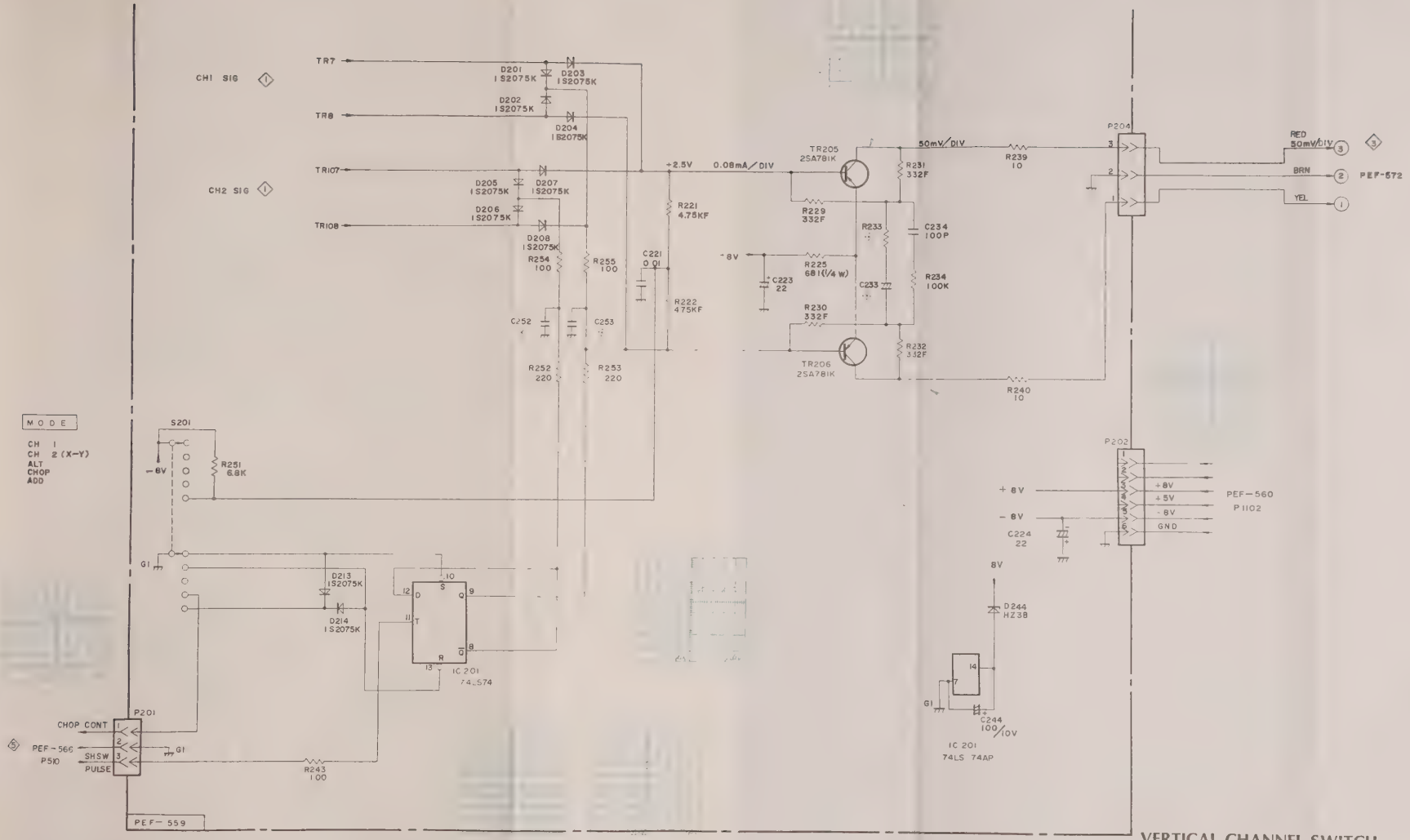
PEF-570 BATTERY CHARGER

Part Code	Symbol	Description	Remarks
		Resistors	
RMR2789	R 1501	Metal 2W 22Ω ±5%	
RMR2791	1501	Metal 2W 47Ω ±5%	
RMR2789	1502	Metal 2W 22Ω ±5%	
RMR2791	1502	Metal 2W 47Ω ±5%	
RCR3068	1503	Carbon 1/4W 4.7kΩ ±5%	
RCR3068	1504	Carbon 1/8W 4.7kΩ ±5%	
RCE0649	1505	Carbon 1/8W 22kΩ ±5%	
RSE0434	1506	Solid 1/4W 10mΩ ±5%	
RCE0645	1508	Carbon 1/8W 10kΩ ±5%	
RCE0639	1510	Carbon 1/8W 3.3kΩ ±5%	
RCE0644	1511	Carbon 1/8W 8.2kΩ ±5%	
		Capacitor	
CES0040	C 1510	Al Elyc 50V 10μF ±20%	

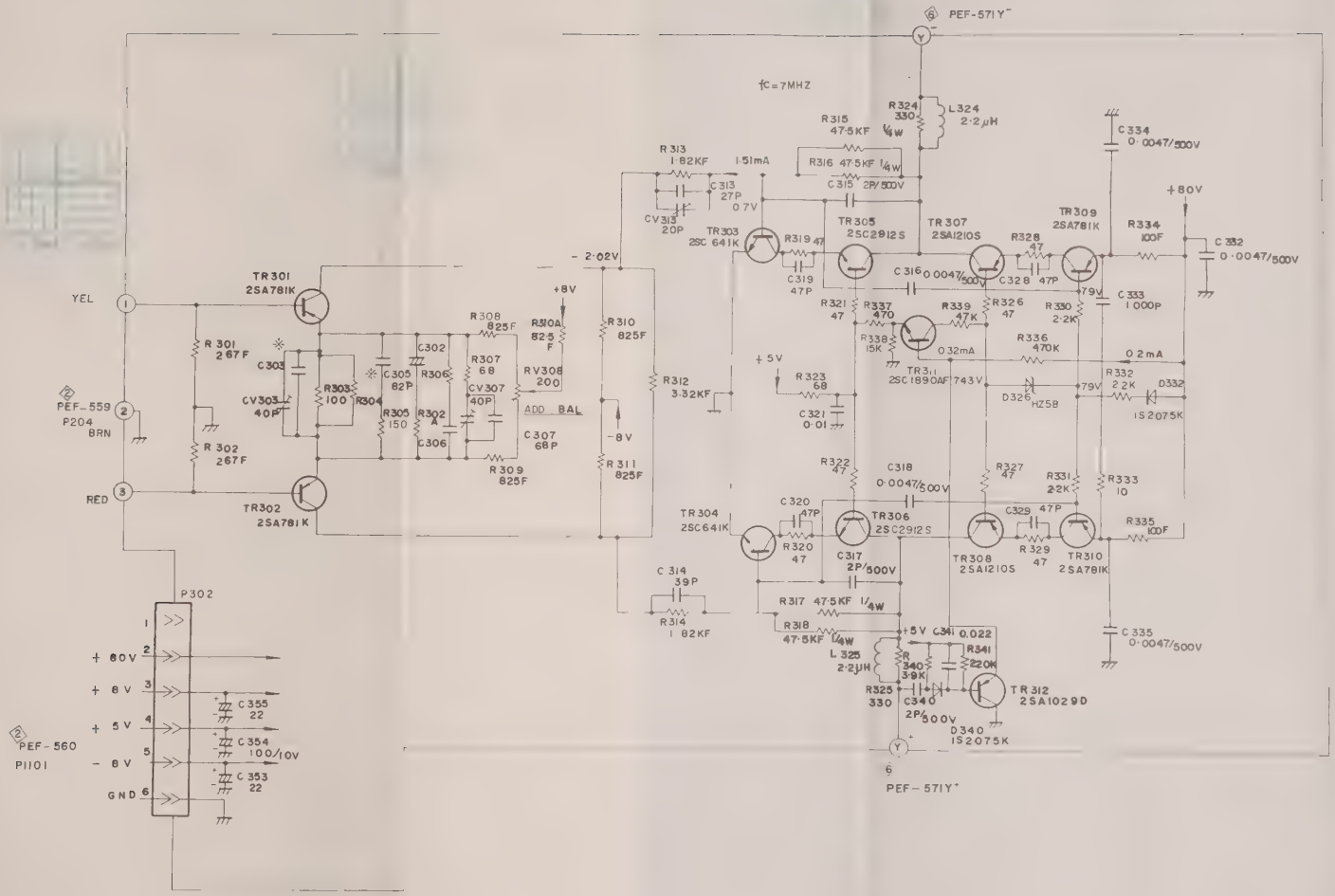
Part Code	Symbol	Description	Remarks
		Transistors	
HTA0224	TR 1501	2SA1029 D	
HTA0224	1502	2SA1029 D	
		Var. Resistors	
RNT0242	RV 1501	Metal TM64K (PV2) 1kΩ	
RNT0237	1501	Metal TM64K (PH) 1kΩ	
		Diodes	
HDH0029	D 1501	Zenner HZ-5B	
HDH0029	1503	Zenner HZ-5B	
HDV0019	1511	V06C	
119585	PEF-570	PCB PB-11	
		Connectors	
JBX0468	P 1501	171825-3	
JBX0468	1502	171825-3	



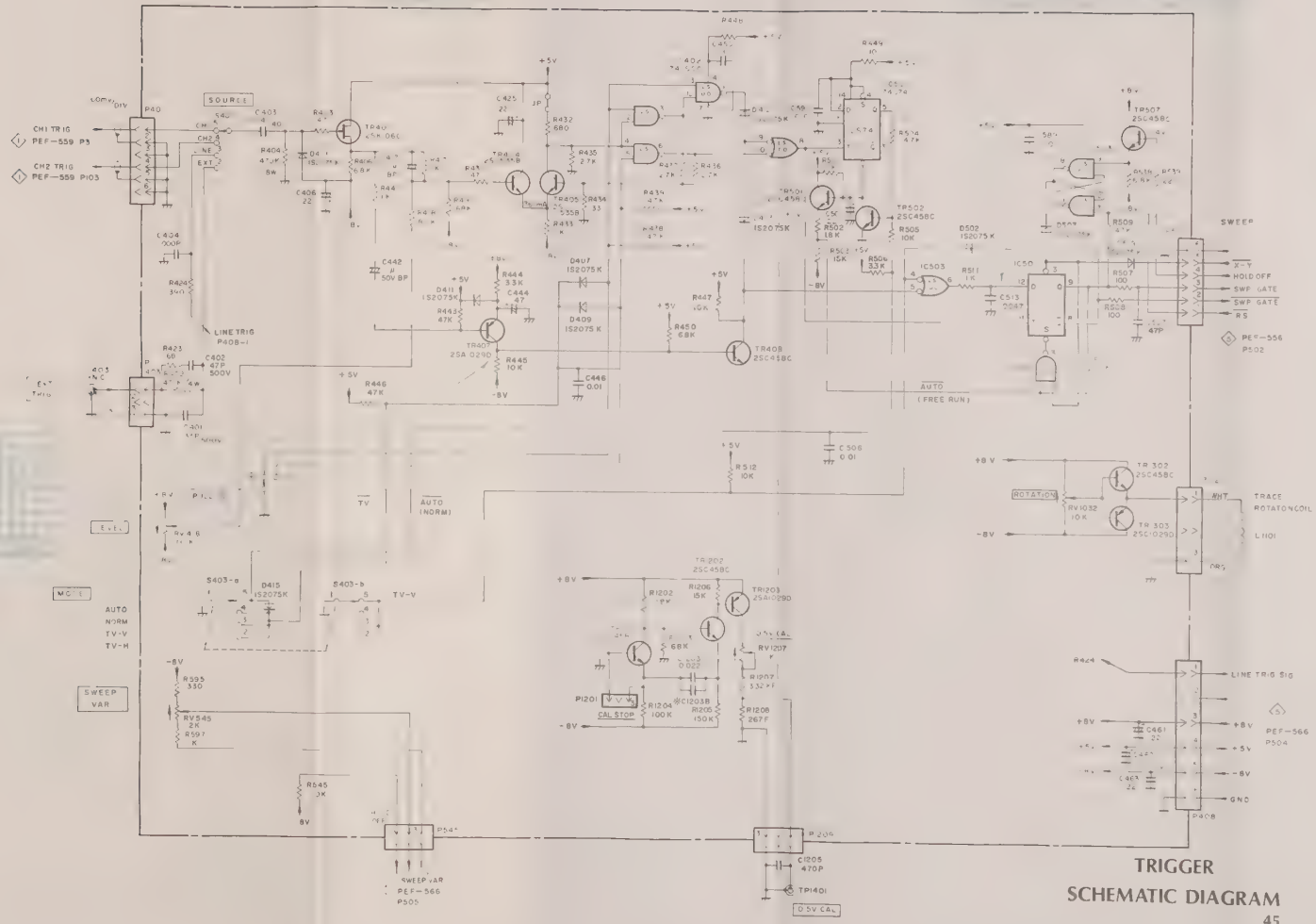
VERTICAL PREAMPLIFIER
SCHEMATIC DIAGRAM



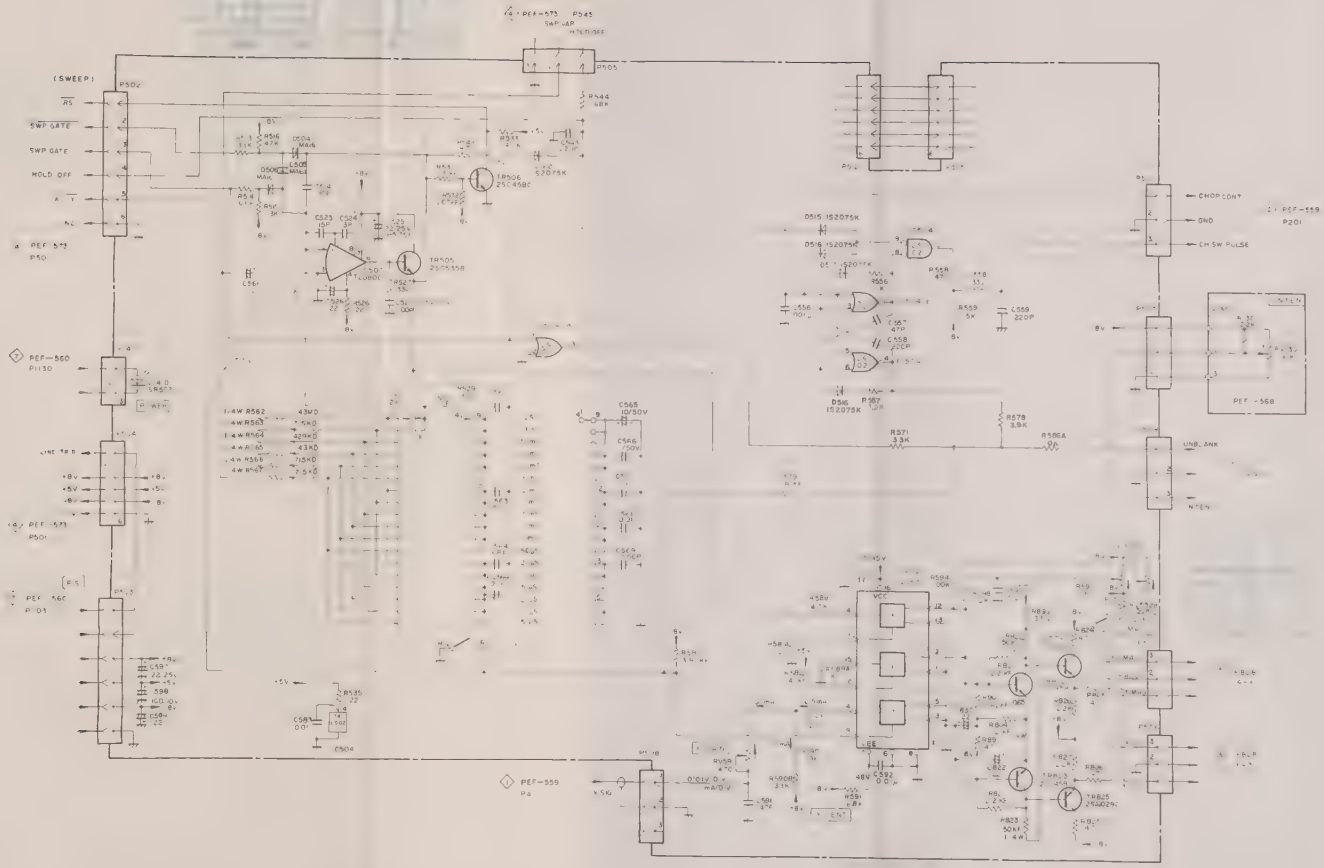
VERTICAL CHANNEL SWITCH
SCHEMATIC DIAGRAM



VERTICAL OUTPUT AMPLIFIER
SCHEMATIC DIAGRAM

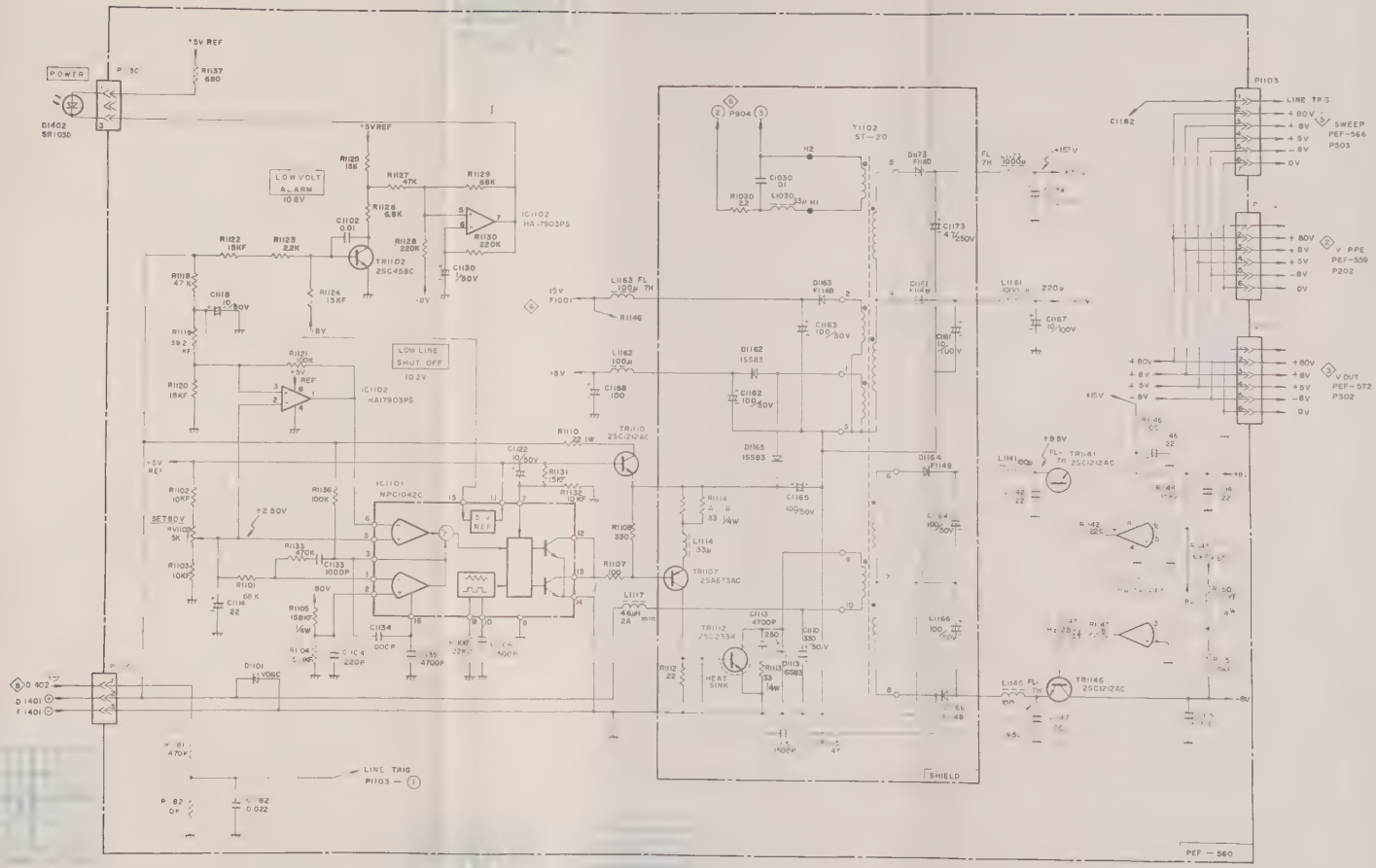


TRIGGER
SCHEMATIC DIAGRAM

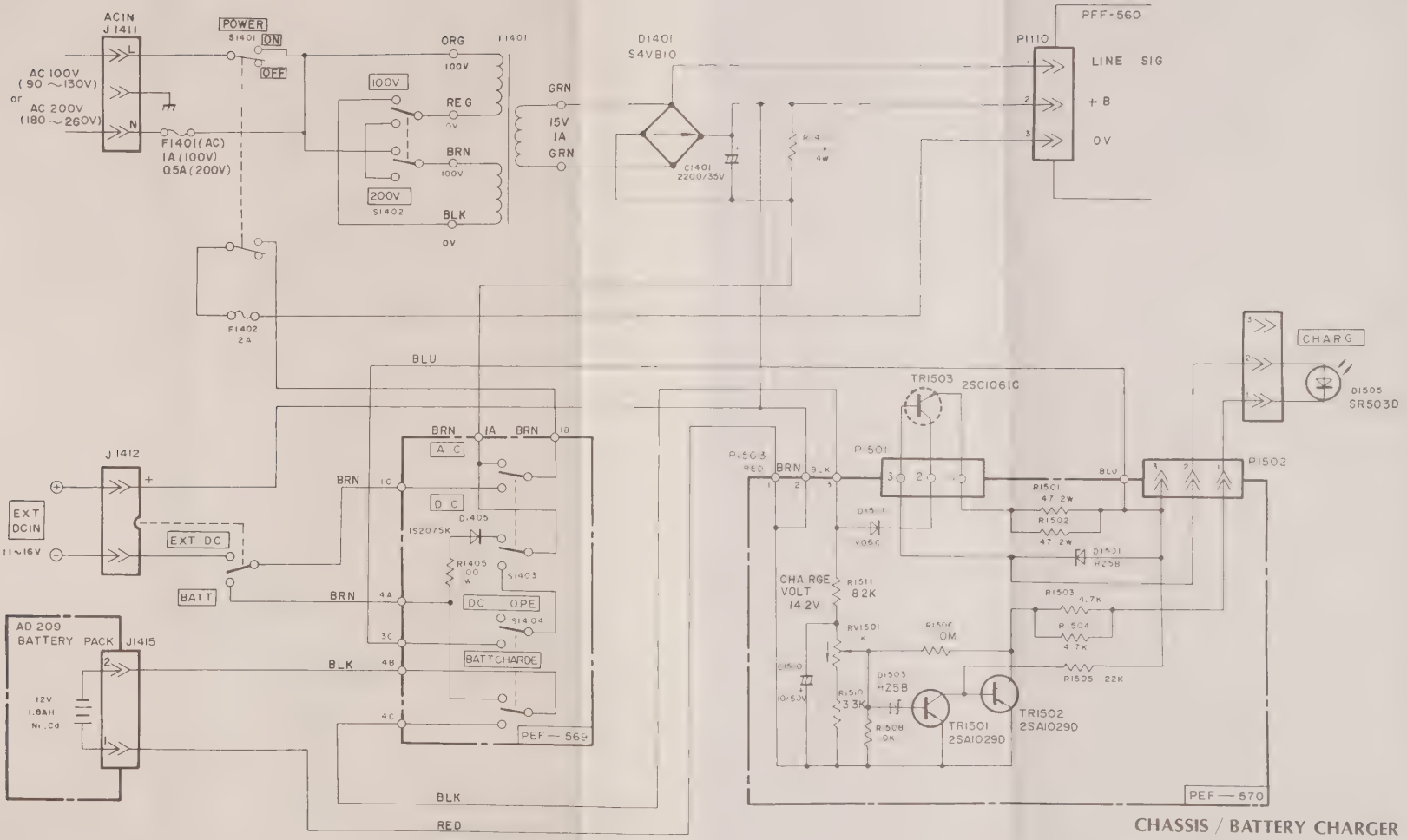


SWEEP GENERATOR
SCHEMATIC DIAGRAM

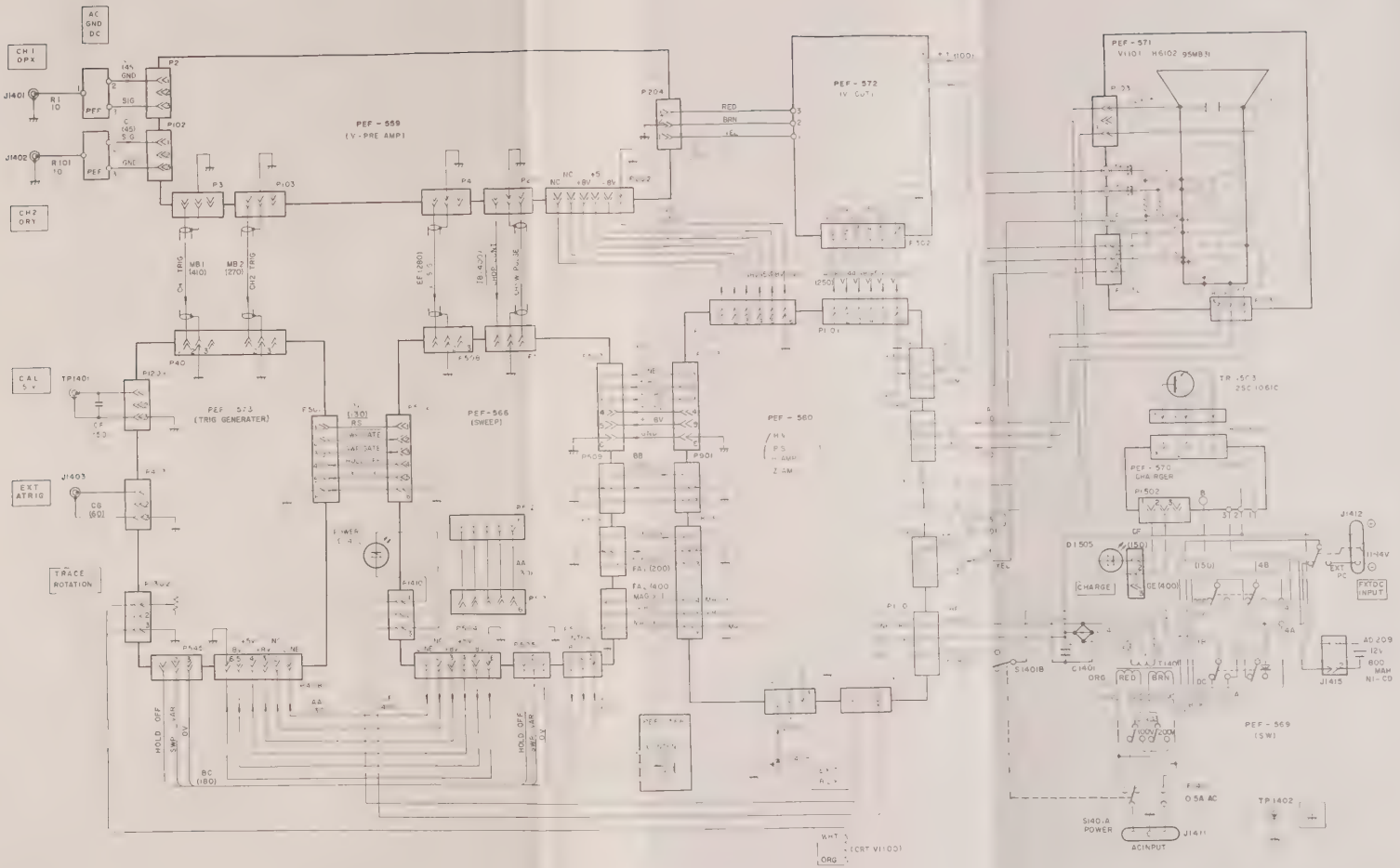
HIGH VOLTAGE, Z-AXIS
HORIZONTAL AMPLIFIER
SCHEMATIC DIAGRAM



POWER SUPPLY
SCHEMATIC DIAGRAM



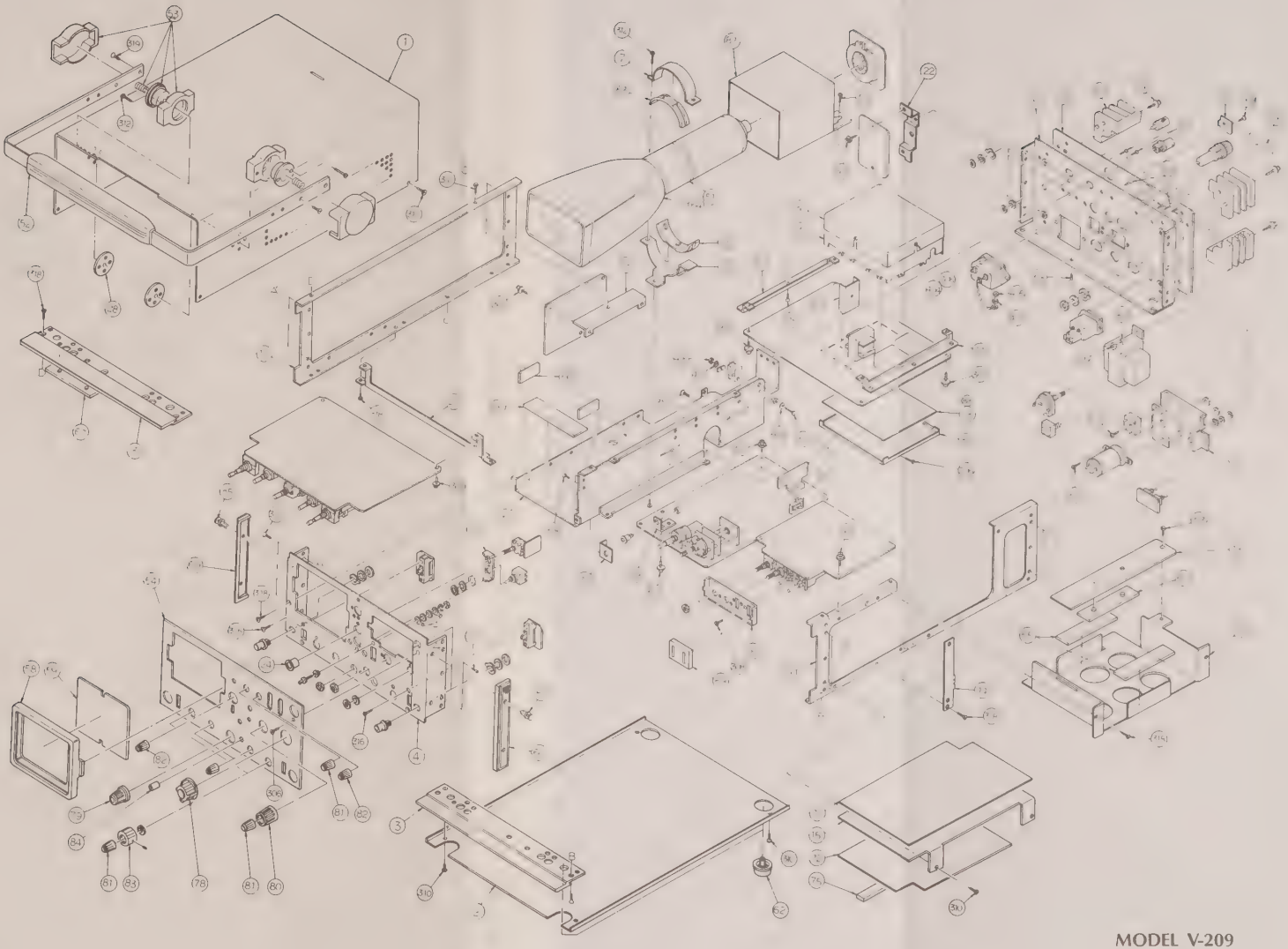
CHASSIS / BATTERY CHARGER
SCHEMATIC DIAGRAM


AC GND DC
CH1 OPX
J1401
R1 10
P2
P102
PEF - 559 (V - PRE AMP)
J1402
R101 10
CH2 ORY
P3
P103
P4
P204
RED
BRN
PEF - 572 (V OUT)
P102
PEF - 571
V1101 H6102 95MB31
P33
CH1 TRIG
MB1 (410)
MB2 (270)
CH2 TRIG
EF (280)
IB (420)
P40
P1 01
CAL 5 V
TP1401
PEF - 573 (TRIG GENERATER)
PEF-566 (SWEEP)
PEF - 560
P901
TR .5C3 25C1061C
PEF - 570 CHARGER
P1502
J1412
11-14V
EXT PC
EXT ATRIG
J1403
CHARGE
D1505
GE1400
FXTDC INPUT
TRACE ROTATION
S1401B
C1401 ORG
RED
BRN
J1415
AD209 12V 800 MAH NI-CD
HOLD OFF
BC (180)
PEF - 569 (SW)
F2 0.5A AC
S1401A POWER
J1411
AC INPUT
TP1402
WHT
ORG
(CRT V1100)

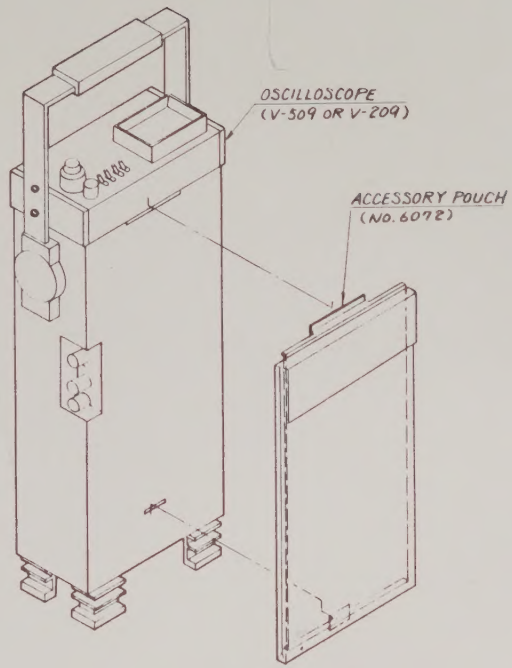
9. MECHANICAL PARTS LIST AND EXPLODED VIEW

Part Code	Symbol	Description	Q'ty	Remark
4170086-B	1	Cover	1	
4170087-A	2	Cover, bottom	1	
4170088-A	3	Plate	1	
4901622-A	4	Chassis, front	1	
4901623-AA	5	Chassis, rear	1	
4901624-AA	6	Chassis, CRT	1	
4477094-A	7	Cord band	1	
4477095-A	8	CRT band	1	
4901626-A	9	Angle, right	1	
4901627-A	10	Angle, left	1	
4129390-AA	12	Chassis, BATT	1	
4477096-A	13	Plate	1	
4477647-A	14	Bracket	1	
4477111-A	15	Foot, mount	1	
4477130-A	16	Bracket	1	
4170088-A	17	Bracket	1	
4477111-A	18	Bracket	1	
4477113-A	19	Bracket	1	
4170097-A	20	Bracket	1	
4477128-A	21	Bracket	1	
4477114-A	22	Bracket	1	
4477115-A	23	Bracket	1	
4581108-A	24	Nut, RV	1	
4477160-A	27	Heat sink	1	
4477161-A	28	Screw plate	1	
4171583-A	29	HV cover	1	
4173582-A	30	HV cap	1	
4173581-A	31	HV cap	1	
4158436-A	32	Bracket	1	
4336013-A	33	Shield case	1	
4477132-A	34	Heat sink	1	
4477029-A	35	Insul. sheet, TR	1	
4172051-A	36	Panel, front	1	
4173581-B	37	Panel, rear	1	
4172127-A	38	Panel, power	1	
4170025-A	39	Bezel	1	
4170026-A	40	Filter	1	
4170027-A	41	Cover, SW	1	
4149031-A	42	Foot, rear	2	
4140757-A	43	Foot	2	
4144055-A	44	Rubber	4	
4158611-A	45	Rubber	1	
4477147-B	46	Rubber	1	
4477107-A	47	Cushion	1	
4477071-A	48	Rubber	1	
4477067-B	49	Spacer, SW	1	
4477088-A	51	Sheet, insulating	1	
4477090-A	52	Sheet, insulating	1	
4477091-A	53	Sheet, insulating	1	
4477074-B	54	Cushion	1	
4140804-B	55	Knob	1	VOL
4144321-B	56	Knob	1	TINT
4113323	57	Knob	1	BRIGHT
4144324-A	58	Knob	1	CONTRAST
4144321-D	59	Knob	1	SHARP
4122684-A	60	Knob	1	CHAN
4135339-A	61	Knob	1	POWER
4843063-B	62	Label	1	VOLUME
4477099-A	63	Label	1	SPEAKER
4838406-B	64	Shield case	1	
4336858-A	65	Spacer	1	
M A0651	101	Screw, sems (sw-w)	15	M3x6
4140167-C	102	Screw, sems (sw-w)	1	M4x

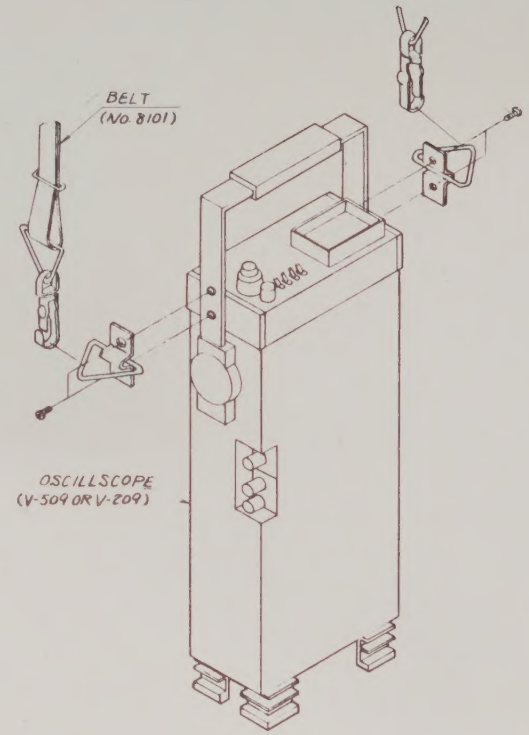
Part Code	Symbol	Description
XC A0[illegible]	[illegible]	[illegible]
XC A1[illegible]	107	[illegible]
XC A0[illegible]	108	[illegible]
XC A1811	109	Screw, black
XC A[illegible]	110	Screw
XC A[illegible]	111	Screw
XC A[illegible]	112	Screw
XC A[illegible]	113	Screw
XC A[illegible]	[illegible]	Screw, flat
XC A[illegible]	[illegible]	Screw, flat
XC A[illegible]	[illegible]	Screw, flat
XC A[illegible]	[illegible]	Screw, flat
XC A1[illegible]	[illegible]	Washer, spring
XC A1[illegible]	[illegible]	Washer, spring
XC A[illegible]	[illegible]	Washer
XC A[illegible]	[illegible]	Washer
XC A[illegible]	135	Nut
XC A1[illegible]	[illegible]	Nut



MODEL V-209
EXPLODED VIEW



ATTACHMENT OF THE
ACCESSORY POUCH



ATTACHMENT OF THE
SHOULDER BELT

HITACHI DENSHI, LTD.
23-2, Kanda Suda-cho 1-chome, Chiyoda-ku, Tokyo 101, Japan
Phone : (03) 3255-8411, Telex : J24178

HITACHI DENSHI AMERICA, LTD. *

Headquarters and New York Office
150 Crossways Park Drive, Woodbury, New York 11797, U. S. A.
Phone : (516) 921-7200, FAX : 516-496-3718, Telex : 510-221-1899

Chicago Office
250 East Devon Ave., Suite 115 Itasca, Illinois 60143, U. S. A.
Phone : (312) 250-8050 FAX : 213-250-8054

Los Angeles Office
371 Van Ness Way, Suite 120 Torrance, California 90501, U. S. A.
Phone : (310) 320-6116, FAX : 310-328-8252

Dallas Office
5910 North Central Expressway Suite1000, Dallas, Texas 75206, U. S. A.
Phone : (214) 891-0301, FAX : 214-891-0382

Atlanta Office
3610 Clearview Parkway, Doraville, Georgia 30340, U. S. A.
Phone : (404) 451-9453, FAX : 404-458-8356

HITACHI DENSHI, LTD. (CANADA) *

Head Office
85 Mellford Drive, Scarborough, Ontario M1B 2G6, Canada
Phone : (416) 299-0900, FAX : (416) 299-0450, Telex : 662-5324

Eastern Office
6096 Trans-Canadienne, St-Laurent, Quebec H4S 1M5, Canada
Phone : (514) 332-5685, FAX : (514) 335-1664, Telex : 582-4768

Western Office
3439-12th St North-East, Calgary, Alberta T2E 6S6, Canada
Phone : (403) 291-4388, FAX : (403) 250-1624, Telex : 382-5861

Ottawa Office
159 Colonnade Road, Unit #3, Nepean, Ontario, K2E 7J4, Canada
Phone : (613) 727-3980, FAX : (613) 727-3955, Telex : 053-4535

HITACHI DENSHI (EUROPA) GmbH *

Head Office
Weiskircher Straße 88, D-6056 Rodgau 1 (Jügesheim), F. R. Germany
Phone : (06106) 13027, FAX : (06106) 16906, Telex : 417 840

HITACHI DENSHI (U. K.) LTD. *

Head Office
13/14 Garrick Industrial Centre, Irving Way, Hendon, London NW9 6AQ,
United Kingdom
Phone : (81) 202-4311, FAX : 01-202-2461, Telex : 27449

Leeds Office
Vided House, 55 Manor Road, Leeds, LS11 5PZ, United Kingdom
Phone : 0532-430294, FAX : 0532-459253

HITACHI DENSHI, LTD., BEIJING OFFICE
100004 Beijing Fortune Building
5, Dong San Huan Bei-Lu, Chao Yang District,
Beijing, China
Phone : 501-4322/4323, FAX : 501-4324

Beijing Service Center
57 Xisi Dongdajie, Beijing, China
Phone : 66-7649

* Subsidiaries of Hitachi Denshi, Ltd.

www.manualsplus.com
1035794

Printed in Japan 92015JN0796 (3)
FNo. 4772 MCA 0639